

1 IN THE UNITED STATES DISTRICT COURT

2 FOR THE EASTERN DISTRICT OF TEXAS

3 MARSHALL DIVISION

4 VOCALIFE LLC, ) (

5 PLAINTIFF, ) ( CIVIL ACTION NO.

6 ) ( 2:19-CV-123-JRG

7 VS. ) ( MARSHALL, TEXAS

8 ) (

9 AMAZON.COM, INC. and ) (

10 AMAZON.COM LLC, ) ( OCTOBER 6, 2020

11 DEFENDANTS. ) ( 8:27 A.M.

12 TRANSCRIPT OF JURY TRIAL

13 MORNING SESSION

14 BEFORE THE HONORABLE JUDGE RODNEY GILSTRAP

15 UNITED STATES CHIEF DISTRICT JUDGE

16  
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Official Reporter  
20 United States District Court  
Eastern District of Texas  
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23

24 (Proceedings recorded by mechanical stenography, transcript  
produced on a CAT system.)

25

08:22:33 1 P R O C E E D I N G S

08:22:33 2 (Jury out.)

08:22:34 3 COURT SECURITY OFFICER: All rise.

08:22:35 4 THE COURT: Be seated, please.

08:27:52 5 Are the parties prepared to read into the record  
08:28:02 6 those items from the list of pre-admitted exhibits used  
08:28:05 7 during yesterday's portion of the trial?

08:28:08 8 MR. FABRICANT: Yes, Your Honor.

08:28:09 9 THE COURT: Please proceed.

08:28:15 10 MS. FABRICANT: Good morning, Your Honor.  
08:28:24 11 Samantha Fabricant for the Plaintiff Vocalife.

08:28:27 12 The following exhibits were used on Monday,  
08:28:31 13 October 5th, 2020. PTX-12, PTX-78, PTX-79, PTX-113,  
08:28:43 14 PTX-115, PTX-120, PTX-124, PTX-125, PTX-126, PTX-128,  
08:28:57 15 PTX-129, PTX-301, PTX-321, PTX-358, PTX-359, PTX-386,  
08:29:10 16 PTX-399, PTX-441, PTX-545, PTX-647, PTX-654, PTX-1071,  
08:29:23 17 PTX-1372, PTX-1377, PTX-1378, and PTX-1469 and are being  
08:29:34 18 moved into evidence.

08:29:35 19 THE COURT: All right. Thank you, Ms. Fabricant.

08:29:37 20 Any objection from Defendant?

08:29:39 21 MR. AKIN: No objection.

08:29:40 22 THE COURT: Does Defendant have a similar  
08:29:42 23 rendition to offer?

08:29:43 24 MR. AKIN: Yes, Your Honor.

08:29:43 25 THE COURT: Please proceed.

08:29:45 1 MR. AKIN: Kyle Akin on behalf of Amazon.

08:29:48 2 Amazon moves in the following exhibits used  
08:29:50 3 yesterday, Monday, October 5th: DTX-81, DTX-319, DTX-418,  
08:30:00 4 and PTX-1311.

08:30:02 5 THE COURT: All right. Any objection to that  
08:30:04 6 rendition by the Plaintiff?

08:30:06 7 MS. FABRICANT: No objection, Your Honor.

08:30:08 8 THE COURT: All right. Counsel, thank you.

08:30:13 9 Mr. Hadden, is the Defendant prepared to go  
08:30:15 10 forward with its case-in-chief?

08:30:17 11 MR. HADDEN: Yes, Your Honor.

08:30:17 12 THE COURT: All right. Let's bring in the jury,  
08:30:20 13 please.

08:30:20 14 COURT SECURITY OFFICER: All rise.

08:30:20 15 (Jury in.)

08:30:21 16 THE COURT: Welcome back, ladies and gentlemen.  
08:30:52 17 Please be seated.

08:30:52 18 As you'll recall, the Plaintiff rested its  
08:30:57 19 case-in-chief at the end of the day yesterday. We'll now  
08:31:01 20 proceed with the Defendants' case-in-chief.

08:31:03 21 Mr. Hadden, call the Defendants' first witness,  
08:31:06 22 please.

08:31:06 23 MR. HADDEN: Yes, Your Honor.

08:31:07 24 Amazon calls Rohit Prasad.

08:31:09 25 THE COURT: All right. Mr. Prasad, if you'll come

08:31:13 1 forward and be sworn.

08:31:20 2 Are there binders to distribute, counsel?

08:31:24 3 MR. HADDEN: Yes, Your Honor.

08:31:25 4 THE COURT: Let's do that now, then.

08:31:29 5 MR. HADDEN: Thank you.

08:31:30 6 (Witness sworn.)

08:31:31 7 THE COURT: Please come around, sir. Have a seat  
08:31:37 8 on the witness stand.

08:31:38 9 All right. Counsel, you may proceed with your  
08:32:04 10 direct examination.

08:32:04 11 MR. HADDEN: Thank you, Your Honor.

08:32:04 12 ROHIT PRASAD, DEFENDANTS' WITNESS, SWORN

08:32:04 13 DIRECT EXAMINATION

08:32:05 14 BY MR. HADDEN:

08:32:05 15 Q. Good morning, Mr. Prasad.

08:32:07 16 A. Good morning.

08:32:07 17 Q. Could you introduce yourself to the jury?

08:32:10 18 A. My name is Rohit Prasad.

08:32:12 19 Q. And what's your job at Amazon?

08:32:15 20 A. I'm a vice president and the head scientist for  
08:32:19 21 Amazon's Alexa's artificial intelligence team.

08:32:23 22 Q. And where did you go to school, Mr. Prasad?

08:32:26 23 A. I got my Bachelor's degree from India, Birla Institute  
08:32:26 24 of Technology, in electronics and communications  
08:32:31 25 engineering, and my Master's degree from Illinois Institute

08:32:37 1 of Technology, which is commonly called Illinois Tech.

08:32:40 2 Q. And what were you doing before you joined Amazon?

08:32:43 3 A. Before joining Amazon, I was working for a company  
08:32:48 4 called BBN Technologies. It was acquired by Raytheon in  
08:32:51 5 2009, and I worked there for 14 years.

08:32:53 6 Q. And what did you do at Raytheon -- or first at BBN  
08:32:58 7 Technologies and then at Raytheon?

08:33:00 8 A. I was leading a very large R&D program sponsored by  
08:33:08 9 U.S. Government like Da -- Defense Advanced Research  
08:33:08 10 Program Agency, or DARPA, at the U.S. Army, and many other  
08:33:13 11 agencies that I worked with them on many different areas of  
08:33:17 12 speech recognition, speech-to-speech translation by which  
08:33:20 13 we need a device with which you can speak to in one  
08:33:23 14 language and translate in another and translate back, and  
08:33:26 15 many years of natural language understanding and  
08:33:29 16 conversational artificial intelligence, which is similar to  
08:33:32 17 Alexa.

08:33:33 18 Q. Can you give us an example of some of the projects you  
08:33:36 19 worked on at Raytheon for the government?

08:33:38 20 A. Yes, several. One, I worked on a ground-breaking  
08:33:43 21 effort for speech recognition where we were trying to get  
08:33:44 22 to human level accuracy in speech recognition. That which  
08:33:46 23 is about converting audio to text form. I also worked on,  
08:33:50 24 as I mentioned, speech-to-speech translation, which means  
08:33:53 25 we were shipping devices with soldiers who were in war

08:33:58 1 zones to talk to locals in their language. Like you could  
08:34:03 2 speak in English as a soldier, translate into Iraqi Arabic,  
08:34:03 3 and then vice versa, all in real-time.

08:34:06 4 And my last project, which I was the principal  
08:34:10 5 investigator before arriving at Amazon, was in detecting  
08:34:13 6 psychological health distress like science of PTSD,  
08:34:19 7 depression and suicidology from soldiers returning from war  
08:34:26 8 zones, by understanding human machine interaction and human  
08:34:27 9 language. That was my last effort before I joined Amazon.

08:34:30 10 Q. And did you have a government security clearance to  
08:34:33 11 work on these projects at Raytheon?

08:34:35 12 A. Yeah, I did. I had a top secret clearance, TS/SCI,  
08:34:38 13 specifically.

08:34:38 14 Q. And when did you join Amazon?

08:34:41 15 A. I joined Amazon in April 2013.

08:34:43 16 Q. And what did you do when you joined Amazon?

08:34:46 17 A. I was hired into the Amazon's Alexa team, and my focus  
08:34:51 18 was on far-field speech recognition, by which we mean you  
08:34:55 19 could talk to a device from 20 feet to 40 feet away by just  
08:34:59 20 speaking the wake word, as you addressed me, as Dave is  
08:35:04 21 doing right now.

08:35:05 22 And then it has to understand everything you're  
08:35:08 23 saying and take an action. And so that was where my focus  
08:35:13 24 was on technologies, on detecting wake word as in the name  
08:35:15 25 Alexa, amongst everything, and understanding the words

08:35:18 1 you're speaking, first recognize, converting the sound  
08:35:22 2 waves into text, and then converting the text to meaning.

08:35:25 3 Q. And how many employees at Amazon were working on Alexa  
08:35:29 4 when you joined in 2013?

08:35:30 5 A. When I joined in 2013, there were 10 people on my team  
08:35:36 6 in the first month.

08:35:37 7 Q. Okay. And how many engineers and scientists are  
08:35:41 8 working on Alexa today at Amazon?

08:35:43 9 A. There are more than 10,000 people working on Alexa.

08:35:46 10 Q. And we talked a lot about Alexa. Do you have some  
08:35:51 11 demonstratives that will help you explain how Alexa works  
08:35:54 12 to the jury?

08:35:55 13 A. Yes, I have prepared some.

08:36:03 14 Q. So, to start with, what is Alexa, Mr. Prasad?

08:36:06 15 A. You can think of Alexa as a virtual robot. There's no  
08:36:10 16 physical thing that's moving around, but it's embodied in  
08:36:14 17 one of our devices. You just speak to it as we speak to  
08:36:17 18 each other, and it understands what you're saying and takes  
08:36:21 19 an action on your behalf. Like if you wanted to play  
08:36:24 20 music, it will play music for you.

08:36:26 21 So it revolutionizes daily convenience for all of  
08:36:30 22 us as we know it.

08:36:31 23 Q. And what was the inspiration for Alexa?

08:36:33 24 A. The inspiration for Alexa was the Star Trek computer.  
08:36:38 25 If you've seen the Star Trek episodes, there was a virtual



08:36:42 1 computer that you could just speak to. That was our  
08:36:44 2 inspiration, but we wanted to bring it in the hands of  
08:36:48 3 everyone everywhere.

08:36:48 4 Q. And has Amazon come close to achieving that vision?

08:36:53 5 A. I would say we have started, but we are extremely proud  
08:36:57 6 of how far we have come. What used to be science fiction  
08:37:01 7 is reality now, so definitely we have come closer. But we  
08:37:04 8 are trying to achieve human life capabilities, which is  
08:37:08 9 still very, very far away.

08:37:10 10 Q. And what can a customer ask Alexa to do today?

08:37:13 11 A. Alexa's capabilities are limitless. They're growing  
08:37:17 12 every day. We think of all the functionality that Alexa  
08:37:21 13 has. The most popular you can think of is, if you're a  
08:37:26 14 music enthusiast, is you ask for music by just saying:  
08:37:31 15 Play music by Beatles.

08:37:33 16 Or if you have smart home devices like lightbulbs  
08:37:38 17 and thermostats nowadays are Wi-Fi enabled, which means you  
08:37:38 18 can connect to them, then Alexa can control it for you.

08:37:41 19 And -- and -- but everyday information, you want  
08:37:45 20 to know about the weather, the football game, all of that  
08:37:48 21 Alexa makes it extremely easy to get and -- and there's  
08:37:53 22 limitless possibilities.

08:37:55 23 Q. So if we start with your example, playing music. Can  
08:37:59 24 you explain how that would work in Alexa?

08:38:00 25 A. Yeah. The very first step as -- as shown here is you

08:38:04 1 say: Alexa, play the Beatles. The very first thing that  
08:38:10 2 happens when you're speaking is that sound wave has to --  
08:38:13 3 Alexa from that sound wave has to detect that you are  
08:38:16 4 addressing the machine, which is Alexa in this case. So it  
08:38:20 5 has to understand that word "Alexa" amongst everything else  
08:38:23 6 happening in the house.

08:38:25 7 Then once Alexa is detected using a component  
08:38:29 8 called wake word detected, which is essentially saying just  
08:38:31 9 simply trying to say, is there a wake word being spoken or  
08:38:35 10 not, which is an extremely hard problem, by the way.

08:38:38 11 Then once it has detected with a very high  
08:38:41 12 confidence, just like somebody called my name, I would  
08:38:44 13 respond if I'm sure they said my name, then Alexa starts  
08:38:48 14 streaming the audio to the Cloud.

08:38:50 15 Q. And you mentioned the Cloud. What is the Alexa Cloud?

08:38:53 16 A. The Alexa Cloud you can think of is a collection of  
08:38:58 17 very powerful computer servers, massive computers, that are  
08:39:05 18 essentially there to understand -- where we can run these  
08:39:08 19 very complex algorithms that convert audio to textual form,  
08:39:14 20 as in text or sequence of words.

08:39:16 21 And then a lot of other processing that happens, I  
08:39:21 22 can walk through as we go. But the very -- the main reason  
08:39:24 23 to be in the Cloud is understanding human language is an  
08:39:27 24 incredibly hard problem. You can't just do it on the  
08:39:30 25 device. In fact, Alexa's brains reside in the Cloud.

08:39:35 1 Q. We have this graphic up that shows this box ASR and  
08:39:39 2 these flashing lights. Can you explain what the ASR  
08:39:42 3 component in the Cloud does?

08:39:44 4 A. Absolutely. So once the wake word is detected, the  
08:39:50 5 sound wave in digitized form gets -- starts streaming to  
08:39:53 6 the Cloud, and the light ring comes on on the Echo device  
08:39:56 7 to show that your sound wave in digitized form is going  
08:40:00 8 towards the Cloud.

08:40:01 9 Then -- ASR means automatic speech recognition, by  
08:40:04 10 which we mean it's -- it's a software engine that converts  
08:40:08 11 the sound wave to digitized form into text. That is what  
08:40:13 12 it does, and it uses lot of these what we call powerful  
08:40:18 13 neural network models.

08:40:21 14 You can think of neural networks as -- as a  
08:40:23 15 collection of big set of nodes and edges, very much like  
08:40:28 16 our neurons in our brain. So it's trying to mimic that  
08:40:31 17 behavior where it's listening towards the -- to the sound  
08:40:36 18 units and trying to understand what are these sound units  
08:40:38 19 and compose a sequence of words to produce.

08:40:40 20 Now, you're trying to produce millions and  
08:40:42 21 millions of -- Alexa has the capability to understand  
08:40:46 22 millions of words, and the sequence of words possible are  
08:40:48 23 limitless, just like I'm speaking here.

08:40:51 24 So it's an incredibly hard problem, but we use  
08:40:54 25 very sophisticated machine learning, specifically deep

08:40:58 1 neural networks, with millions and millions of parameters  
08:41:01 2 to understand human speech.

08:41:03 3 Q. And you mentioned machine learning and these deep  
08:41:06 4 neural networks. How do those deep neural networks learn  
08:41:10 5 to go from a certain sound to a set of words?

08:41:13 6 A. Yeah. So the way these machine learning components  
08:41:18 7 like a neural network is trained that the software  
08:41:22 8 engine -- the training component of it, just like you train  
08:41:24 9 a kid to learn a language, is given many different examples  
08:41:28 10 of audio and the corresponding words or transcripts, just  
08:41:34 11 like a transcription happening right now.

08:41:38 12 That is then fed to a learning engine that trains  
08:41:42 13 the parameters of the nodes and edges have each of those  
08:41:44 14 weights, as I just described. Those parameters are learned  
08:41:46 15 by on massive quantities of the data. That's essentially  
08:41:48 16 how this is trained.

08:41:50 17 Q. And when you talk about massive quantities of the data,  
08:41:53 18 are you talking about things like millions of hours?

08:41:56 19 A. Yes, definitely hundreds and hundreds and millions,  
08:41:59 20 close to millions of hours. You can think of millions of  
08:42:03 21 samples are fed into training this system.

08:42:05 22 Q. And what is the result or output of this automatic  
08:42:10 23 speech recognition process?

08:42:11 24 A. Yeah. The output of the speech recognition process is  
08:42:14 25 from audio to text. So the text is the output. So, in

08:42:17 1 this case, now the recognizable after the sound produced  
08:42:22 2 "play the Beatles" as the sequence of words.

08:42:27 3 Q. And what happens in this NLU component that you show on  
08:42:32 4 the diagram here?

08:42:32 5 A. Yeah. As you can see on the diagram, that there is --  
08:42:35 6 when you have said "play music by Beatles," there are many  
08:42:39 7 possibilities of how we are going to play it. And the  
08:42:43 8 natural language understanding component, what it's trying  
08:42:45 9 to do is understand the meaning behind that sequence of  
08:42:49 10 words.

08:42:49 11 In this case, it converts into a structured form  
08:42:52 12 of, oh, I think it is the play music intent, as in that's  
08:42:58 13 the intent of the customer making that request, from an  
08:43:02 14 artist type, in this case Beatles.

08:43:04 15 So the purpose of natural language understanding  
08:43:09 16 is take text as input and convert it into a form that can  
08:43:13 17 be understood by the machine to act -- take an action.

08:43:16 18 Q. And is the problem of taking text and converting it or  
08:43:20 19 discerning from it a meaning that can be performed, is that  
08:43:23 20 a difficult problem?

08:43:24 21 A. Oh, absolutely. That is -- the process of  
08:43:27 22 understanding what we mean is the hardest artificial  
08:43:31 23 intelligence problem that exists. All the experts like --  
08:43:38 24 including me, would definitely agree that's the holy grail  
08:43:43 25 of artificial intelligence.

08:43:45 1 Q. And after the natural language understanding unit  
08:43:47 2 determined what the user meant, what they wanted, what does  
08:43:48 3 Alexa do next?

08:43:49 4 A. Yeah, the next step, as illustrated in this diagram, is  
08:43:54 5 Alexa at this point has determined that the customer is  
08:43:59 6 expressing an intent to play music by the artist Beatles,  
08:44:03 7 but that's not sufficient to take an action.

08:44:05 8           You have to figure out is there -- does the  
08:44:09 9 customer own the Beatles album or should I play from the  
08:44:14 10 Amazon Music catalog or Spotify catalog if the customer has  
08:44:20 11 access to Spotify.

08:44:20 12           So what that -- that part of fulfilling customers'  
08:44:22 13 intent is done by another set of software programs which  
08:44:23 14 are called skills. And that is what this diagram  
08:44:29 15 illustrates, that a skill, in this case a music skill,  
08:44:31 16 determines the best thing to do is play music from Beatles  
08:44:34 17 and, in particular, it could be a song that -- let's say  
08:44:38 18 the customer has owned before like, Hey, Jude. So that can  
08:44:43 19 be an example that comes -- that could be played by the  
08:44:46 20 device.

08:44:46 21 Q. And we've walked through one example here of requesting  
08:44:50 22 to hear the Beatles. How many requests like that does  
08:44:55 23 Alexa receive in a day or a minute?

08:44:58 24 A. So Alexa gets about a billion requests per week. If I  
08:45:04 25 do the math right, it's about 300,000 requests a minute at

08:45:11 1 peak time.

08:45:12 2 Q. And these skills you talked about, does Amazon write  
08:45:15 3 all of those programs, those skills?

08:45:18 4 A. No. As -- as the slide indicates, that Amazon -- we  
08:45:21 5 build quite a few skills ourselves, but Alexa has hundreds  
08:45:26 6 of thousands of skills that are built by hundreds and  
08:45:30 7 thousands of developers worldwide.

08:45:33 8 So, as you can see, there's a whole set of  
08:45:36 9 skills that we own -- in fact, in my house Jeopardy  
08:45:38 10 skill is very popular. So you can just say: Alexa, play  
08:45:39 11 Jeopardy. And you play the latest version of it.

08:45:41 12 You can have -- my son and daughter play lots of  
08:45:44 13 video games. Puzzle of the Day is a very common one, as  
08:45:47 14 well.

08:45:47 15 THE COURT: Mr. Prasad, would you slow down just a  
08:45:50 16 little bit?

08:45:51 17 THE WITNESS: Yes, thank you.

08:45:52 18 THE COURT: You clearly have an accent, and I want  
08:45:54 19 to make sure the jury follows your testimony. So please  
08:45:57 20 speak slower.

08:45:58 21 THE WITNESS: Absolutely.

08:45:59 22 THE COURT: Thank you.

08:46:00 23 Q. (By Mr. Hadden) And why did Amazon -- or why does  
08:46:03 24 Amazon allow these other companies to create skills that  
08:46:05 25 can be used through Alexa?

08:46:06 1 A. We believe there are -- that our customers want a lot  
08:46:13 2 from Alexa. And it's just not possible -- while you have  
08:46:17 3 extremely smart people on our team, that we can do  
08:46:20 4 everything. And that's why we want -- we wanted to have  
08:46:23 5 invention happen by developers around the world so that  
08:46:26 6 they can invent on Alexa, as well as our customers can have  
08:46:30 7 the benefit of those inventions.

08:46:32 8 Q. And does Amazon charge companies to create skills or  
08:46:39 9 connect into Alexa?

08:46:42 10 A. No, we do not charge companies to create skills.

08:46:44 11 Q. Does Amazon provide the research community with  
08:46:54 12 information it's learned developing the type of artificial  
08:46:58 13 intelligence you talked about?

08:46:59 14 A. Yes, we -- we publish a lot. In fact, if you look at  
08:47:04 15 this on your screen, we publish ton of technical papers in  
08:47:11 16 peer-reviewed journals, conferences, and we make all those  
08:47:14 17 papers available on our website.

08:47:16 18 This is an Amazon.science website, which is mostly  
08:47:21 19 more in launching. And this is a central place where the  
08:47:24 20 technical community, not just our customers or people  
08:47:29 21 interested about our products, but even deep researchers  
08:47:32 22 working on many different areas can come and get access to  
08:47:36 23 our innovations.

08:47:37 24 Q. And why does Amazon provide this science website to the  
08:47:42 25 research community?



08:47:42 1 A. I think we are -- the entire speech and language  
08:47:46 2 community is quite open and -- and in general what is now  
08:47:50 3 part of the conversation in the AI community. This is one  
08:47:51 4 way that we can participate and make our entire field get  
08:47:55 5 better. This is the reason why we have this  
08:47:59 6 Amazon.science, and that's why we also publish papers.

08:48:02 7 Q. And let's go back to 2013 when you joined Amazon. Was  
08:48:06 8 there a specific problem that you worked on when you  
08:48:09 9 joined?

08:48:09 10 A. Yeah. I -- I was -- as I mentioned, I joined the  
08:48:14 11 Amazon Alexa team in 2013. And the specific problem I was  
08:48:18 12 asked to lead was called far-field speech recognition, by  
08:48:22 13 which we mean the components of wake word detection that I  
08:48:25 14 showed, like amongst all the speech that's happening or  
08:48:30 15 audio being spoken in your house, is the wake word being  
08:48:32 16 spoken? That's an incredibly hard problem.

08:48:35 17 And then automatic speech recognition, which was  
08:48:38 18 convert the speech to textual form was what I was hired to  
08:48:41 19 build because that's another very inventive problem because  
08:48:45 20 you're trying to understand millions of words in all  
08:48:49 21 combinations of them in an extremely noisy environment.

08:48:52 22 Q. And when you joined, I think you said your team was 10  
08:48:56 23 people; is that correct?

08:48:57 24 A. That's correct.

08:48:58 25 Q. And of those 10 people, how many thought that you could

08:49:01 1 solve this far-field speech recognition problem?

08:49:04 2 A. Nine out of 10 did not think it could be done.

08:49:08 3 Q. And who was the one who thought it could be done?

08:49:13 4 A. I was the one of the optimist.

08:49:18 5 Q. Okay. And can -- can you explain why this far-field  
08:49:26 6 speech recognition presented such a challenge?

08:49:29 7 A. Yeah. So a huge challenge because, first of all,  
08:49:35 8 you're not holding a device in your hand. You're speaking  
08:49:39 9 to it from a very distance -- as -- and if you think about  
08:49:43 10 all the different accents -- Your Honor has just asked me  
08:49:46 11 to slow down.

08:49:47 12 If you think about it like how -- how far I am  
08:49:50 13 from you at that end of the room, just imagine a device now  
08:49:54 14 trying to understand that aspect. That's super hard  
08:50:01 15 because there is lot of dialects, a lot of accents. I have  
08:50:06 16 an accent. I don't speak "play music the Beatles" the same  
08:50:09 17 way many of you do, because I have an Indian accent.

08:50:13 18 That is true in our country, which means there's a  
08:50:16 19 lot of diversity of accents, dialects, noise environment.  
08:50:16 20 Some people live in urban areas where there's lot of  
08:50:21 21 traffic noise you can hear.

08:50:23 22 And if you're -- plus, people don't realize this,  
08:50:27 23 but your house is a very noisy area. You have the TV  
08:50:31 24 running, and sounds like "I like" are very similar to  
08:50:36 25 Alexa. Alex as a name is similar to Alexa.

08:50:40 1 So you get into these incredibly hard problems of  
08:50:43 2 essentially trying to solve the wake word, which is a  
08:50:47 3 needle in a haystack problem because you don't talk to  
08:50:50 4 Alexa every moment. You talk to Alexa maybe 10 times a  
08:50:54 5 day.

08:50:54 6 That is incredibly hard because you're hearing all  
08:50:57 7 kinds of sounds, and the wake word detector on the device  
08:51:01 8 has to first determine that you actually said the wake  
08:51:04 9 word. And then all -- what you're saying has infinite  
08:51:09 10 possibilities, and the home noise makes it a very, very  
08:51:12 11 hard problem.

08:51:13 12 And then last year, I would say, the fact that if  
08:51:15 13 you respond so fast, because for any communication to be  
08:51:19 14 good, you have to be responsive, just makes it an  
08:51:22 15 incredibly challenging task.

08:51:23 16 Q. Have you read the '049 patent in this case, Mr. Prasad?

08:51:26 17 A. Yes, I did.

08:51:27 18 Q. And does that patent provide a solution to this  
08:51:33 19 far-field speech recognition problem you were working on in  
08:51:39 20 2013?

08:51:40 21 MR. BAXTER: Objection, Your Honor. It calls for  
08:51:41 22 expert opinion, which he is not.

08:51:43 23 THE COURT: Sustained.

08:51:46 24 Q. (By Mr. Hadden) Are you familiar with how the  
08:51:48 25 microphones work in an Echo, Mr. Prasad?

08:51:51 1 A. Yes, I'm familiar.

08:51:52 2 Q. And can you explain, at a high level, how that works?

08:51:56 3 A. Yeah. At the high level, Echo has seven microphones,

08:52:00 4 one in the center, six on the circumference. And what

08:52:06 5 happens is each of these microphones pick a signal. These

08:52:09 6 signals are mixed to create six signals of what we call

08:52:16 7 fixed beams in exactly the fixed directions. That's the

08:52:19 8 first operation that happens in terms of audio processing.

08:52:23 9 Q. And why did Amazon choose to use fixed beams in fixed

08:52:28 10 directions?

08:52:29 11 A. Yeah. As I mentioned, there's many spots to the -- to

08:52:34 12 the problem of Alexa responding to your request. This

08:52:37 13 audio processing to generate these beams is just one small

08:52:41 14 part of it. What really happens that is incredibly complex

08:52:48 15 is the next step of processing, wake word detection, as I

08:52:51 16 mentioned the ability to detect the wake word, then the

08:52:55 17 speech recognition, and then the natural language

08:52:56 18 understanding.

08:52:57 19 Those three components are -- is where the magic

08:53:00 20 is. That's what makes the magic of Alexa happen, not the

08:53:03 21 signal.

08:53:04 22 And because of that, what we wanted to make do --

08:53:09 23 we chose the fixed beam as the way to go is because if you

08:53:13 24 when you speak to Alexa, the fixed beams can come from

08:53:18 25 anywhere -- sorry, you -- you can be in any place but the

08:53:20 1 beams are fixed.

08:53:21 2           And the advantages -- sometimes the best beam to  
08:53:26 3 do speech recognition are -- is actually behind -- coming  
08:53:28 4 from the walls because your sound waves reflect from the  
08:53:30 5 wall.

08:53:31 6           So just because there is a better -- this user is  
08:53:34 7 in a particular place, doesn't mean it's the better signal.  
08:53:37 8 It can come from anywhere.

08:53:39 9           So that's the first reason we took the fixed beam  
08:53:42 10 and then select the best beam that is for speech  
08:53:45 11 recognition the best thing to do.

08:53:46 12           The second part, if we use any adaptive technique  
08:53:51 13 where you -- how you combine the beams changes dynamically,  
08:53:55 14 which is called adaptive beamforming, then what happens is  
08:53:59 15 you're training a lot -- we talked about millions of  
08:54:03 16 samples of data to train on has -- gets yet another  
08:54:06 17 variable because the signal is getting morphed or  
08:54:09 18 transformed in different ways, which means we don't know  
08:54:12 19 whether the recognition will actually improve. Alexa may  
08:54:17 20 get worse with -- while entering latency or delay in  
08:54:21 21 responding because you have to have a delay to understand  
08:54:23 22 where the user is.

08:54:24 23           This is why we did not choose adaptive  
08:54:28 24 beamforming. Instead, we chose to work with fixed  
08:54:33 25 beamforming with fixed beams in -- from fixed directions.

08:54:35 1 Q. Are you -- do you know Dr. Li, Mr. Prasad?

08:54:39 2 A. I did interview Dr. Li for a role, so I met him once on  
08:54:45 3 the phone.

08:54:45 4 Q. And when was that?

08:54:46 5 A. That was in, I believe, June 2013.

08:54:50 6 Q. And how did you come to speak with Mr. Li on the phone?

08:54:53 7 A. I was looking to hire a leader for machine learning,  
08:55:01 8 specifically a leader who can come and work on the areas of  
08:55:05 9 wake word detection and speech recognition. And I was  
08:55:07 10 looking for roles for that -- people who can fill those  
08:55:10 11 roles. That's why I spoke with Dr. Li for a position.

08:55:13 12 Q. And did you end up deciding to hire Dr. Li?

08:55:16 13 A. No, I was not inclined to hire Dr. Li.

08:55:19 14 Q. And why did you decide not to hire Dr. Li?

08:55:24 15 A. There were a few reasons. As I mentioned, I was  
08:55:27 16 looking for a domain expert in the areas of machine  
08:55:31 17 learning of wake word detection and speech recognition and  
08:55:34 18 language understanding. And Dr. Li's expertise was not in  
08:55:37 19 that area, with all due respect. It was more in the  
08:55:42 20 microphone array area. And that wasn't where I was focused  
08:55:45 21 on. I needed someone for the other components that I  
08:55:50 22 discussed, specifically wake word detection and speech  
08:55:53 23 recognition.

08:55:53 24 THE COURT: Mr. Prasad, I'm going to ask you again  
08:55:56 25 to try to slow down. You're speeding back up again. It's

08:55:59 1 important that the jury follows your testimony.

08:56:01 2 THE WITNESS: Okay. I will slow down.

08:56:02 3 THE COURT: All right. Counsel, please continue.

08:56:04 4 MR. HADDEN: Thank you, Your Honor.

08:56:05 5 Could we see Defendants' 491, please, Mr. Berk?

08:56:10 6 If you'd just blow up the top, please.

08:56:13 7 Q. (By Mr. Hadden) Are these -- do you recognize this  
08:56:20 8 document, Mr. Prasad?

08:56:21 9 A. Yes, I do.

08:56:22 10 Q. Okay. And what is this?

08:56:23 11 A. This is an -- at Amazon, when we interview someone, we  
08:56:27 12 take copious notes. These were my raw notes entered  
08:56:32 13 after -- I was typing it while I was interviewing Dr. Li,  
08:56:35 14 but this is where we recorded my notes for future.

08:56:40 15 MR. HADDEN: And if you could just scroll down,  
08:56:43 16 Mr. Berk, to that third line down. There you go. Thank  
08:56:46 17 you.

08:56:46 18 Q. (By Mr. Hadden) And what did you describe here in your  
08:56:50 19 notes from that interview, Mr. Prasad?

08:56:51 20 A. Yeah. There were two things I described in this  
08:56:57 21 portion. One, as I mentioned, the area of expertise that  
08:57:00 22 Dr. Li had was not the best fit for the areas I was  
08:57:07 23 leading.

08:57:07 24 The second was that I didn't find a passion in  
08:57:11 25 interviewing Dr. Li about building a groundbreaking product

08:57:15 1 or areas that solved real customer problems. I got a sense  
08:57:19 2 that he was more interested in selling his company, as I  
08:57:22 3 note here, and that's -- those were the two factors that  
08:57:26 4 made me come to the not inclined mode.

08:57:31 5 Q. And in your interview with Dr. Li, did he mention  
08:57:34 6 anything about a prior meeting with Amazon?

08:57:37 7 A. Yes, he did mention, as it's in the notes, that he --

08:57:41 8 MR. HADDEN: Can we go down to that, Mr. Berk?  
08:57:52 9 Just four lines down from where you were. Up a little. I  
08:58:14 10 think we've gone too far.

08:58:14 11 THE WITNESS: Yes.

08:58:17 12 MR. HADDEN: No, farther up. No, sorry, you  
08:58:22 13 passed it.

08:58:24 14 Q. (By Mr. Hadden) Go ahead, Mr. Prasad.

08:58:27 15 A. Yeah. As you see in the second line -- row, he  
08:58:29 16 mentioned he was invited by Lab126 to present technology.  
08:58:33 17 And when was this meeting? Dr. Li told me it was two years  
08:58:36 18 ago.

08:58:36 19 Q. Did he tell you anything else about that meeting?

08:58:38 20 A. No, because I -- I don't recall all -- everything about  
08:58:42 21 it. But he did mention a few things he discussed. But, as  
08:58:47 22 I mentioned, my role was to assess him for the fit in my  
08:58:52 23 team for the areas of machine learning of wake word  
08:58:56 24 detection and speech recognition. So I had a very strong  
08:59:00 25 focus on those areas.



08:59:01 1 Q. And is it standard practice at Amazon to take detailed  
08:59:05 2 notes like this for every interview?

08:59:07 3 A. Yes, we take detailed notes for every interview, as I  
08:59:11 4 mentioned earlier.

08:59:12 5 Q. And do you interview a lot of engineers and scientists  
08:59:15 6 in your job at Amazon?

08:59:16 7 A. Yeah, I -- especially in those days -- first, yes, I  
08:59:20 8 interview a lot of people in these roles. And especially  
08:59:23 9 in those days, because I was building a team, I was  
08:59:26 10 interviewing many people every day.

08:59:27 11 Q. And when -- well, why were you interviewing so many  
08:59:34 12 people back in 2013?

08:59:35 13 A. As I described, we were on a very hard mission, and we  
08:59:38 14 still are. We think of it still as day one for us. And to  
08:59:43 15 solve something like this, we needed the world's best  
08:59:47 16 talent working on these hard problems of artificial  
08:59:52 17 intelligence so that we can come closer to that version of  
08:59:56 18 human level intelligence. And that required hundreds and  
09:00:00 19 hundreds of scientists that I've personally hired and many  
09:00:02 20 engineers, skilled product managers.

09:00:04 21 So we were -- we still hire, and this is an  
09:00:06 22 incredibly hard area, and it would take years to solve.  
09:00:10 23 This is why we needed the world's best talent working with  
09:00:14 24 us together to invent on behalf of our customers.

09:00:16 25 Q. And when did the -- when did Amazon launch the Echo --

09:00:21 1 the first Echo with Alexa?

09:00:23 2 A. The first Echo with Alexa was launched on 6 November,  
09:00:29 3 2014.

09:00:29 4 Q. And did Amazon organize any events around that launch?

09:00:36 5 A. We -- yes, we had multiple events in different cities  
09:00:43 6 as a networking event.

09:00:44 7 Q. And did you participate in those events, Mr. Prasad?

09:00:48 8 A. Yes, I did.

09:00:49 9 Q. And did you go to one of those events in New York City?

09:00:51 10 A. Yes, I did go to an event in New York City.

09:00:54 11 Q. Do you -- do you -- did you meet Dr. Li at that event?

09:00:57 12 A. I have no memory of meeting Dr. Li at that event.

09:01:01 13 Q. Were there lots of people at those events?

09:01:05 14 A. Yeah, we -- we had at least 200 to 300 people in that  
09:01:08 15 event.

09:01:10 16 MR. HADDEN: Can we see Defendants' -- or, sorry,  
09:01:15 17 Plaintiff's 131, please, Mr. Berk?

09:01:21 18 Q. (By Mr. Hadden) I've put a document up on the screen,  
09:01:23 19 Mr. Prasad. It's Plaintiff's 131.

09:01:26 20 Do you recognize this document?

09:01:27 21 A. Yes, I saw this during my deposition.

09:01:32 22 Q. And can you explain what it is?

09:01:34 23 A. It's an email that went from Dr. Li to Ms. Burnham, who  
09:01:51 24 was in our human resources department, asking Ms. Burnham  
09:01:54 25 to forward Dr. Li's message to me.

09:01:58 1 MR. HADDEN: And if you scroll down, Mr. Berk, to  
09:02:00 2 that email to Ms. Burnham, please -- just up a little bit  
09:02:05 3 farther. There you go.

09:02:06 4 Q. (By Mr. Hadden) Did you receive the -- this original  
09:02:12 5 underlying email that Ms. -- Dr. Li was asking Ms. Burnham  
09:02:17 6 to forward to you?

09:02:17 7 A. I have no memory of receiving this email.

09:02:24 8 Q. If we go to the next page, there's a paragraph that  
09:02:32 9 says: Our company holds several patents.

09:02:37 10 Do you see that?

09:02:38 11 A. Yes, I do.

09:02:50 12 Q. And then below that, the next paragraph, it says: It  
09:02:54 13 is our belief that collaborations are the best solution to  
09:02:57 14 this matter.

09:02:58 15 Do you see that?

09:02:58 16 A. Yes, I see that.

09:02:59 17 Q. So if you had received this email from Dr. Li through  
09:03:06 18 Ms. Burnham, what would you make of this?

09:03:12 19 A. I would say as -- if I had gotten this email, I would  
09:03:17 20 have, for professional courtesy, responded to Dr. Li,  
09:03:22 21 thanking him for his interest in collaborating.

09:03:24 22 But as I mentioned, I'd already determined that he  
09:03:30 23 was not the best fit for -- for the areas I was interested  
09:03:33 24 in collaborating or finding talent for, that I would not  
09:03:37 25 waste his or my time. But I would definitely get back to

09:03:41 1 him as professional courtesy, thanking him for his  
09:03:44 2 interest, and maybe in the future to collaborate.

09:03:46 3 Q. And if you had received this email, would you have  
09:03:53 4 interpreted this as an accusation that Amazon was using  
09:03:55 5 Dr. Li's patents?

09:03:56 6 A. Not at all because this lists -- as the intent seems to  
09:04:03 7 be, collaboration.

09:04:03 8 Q. Now, if this email -- if you had received this email  
09:04:06 9 and if the email had actually said, Amazon is using my  
09:04:10 10 patents, what would you have done?

09:04:12 11 A. If that was stated and I had gotten that email, then I  
09:04:17 12 would have sent it to our patent attorneys. We have a very  
09:04:21 13 skilled legal team who actually understand technical  
09:04:25 14 content very, very deeply. And they would look at the  
09:04:28 15 patents and acquisition and anything like that. And they  
09:04:31 16 will get in touch with me if I can add value to that  
09:04:35 17 discussion. That is what I would have done.

09:04:38 18 Q. Okay.

09:04:38 19 MR. HADDEN: Can we put up the slide from the  
09:04:40 20 Vocalife opening, please, Mr. Berk? You can take down the  
09:04:49 21 other one. Thank you.

09:04:49 22 Q. (By Mr. Hadden) Now, Mr. Prasad, Vocalife's counsel  
09:04:53 23 showed this slide to the jury during opening and suggested  
09:04:58 24 that this shows that Amazon meets with companies and then  
09:05:02 25 takes their technology. Have you ever heard or had any

09:05:06 1 experience of Amazon meeting with a company and then taking  
09:05:10 2 their technology?

09:05:10 3 A. Not at all. We -- we invent on behalf of our  
09:05:16 4 customers, and if -- if there's a company that has certain  
09:05:20 5 value to add in our mission to that, then we'll either  
09:05:26 6 license or acquire that company, which has happened in the  
09:05:29 7 past. But we are not in the business of -- of taking  
09:05:32 8 somebody's idea.

09:05:33 9           Instead, we want to invent for -- on behalf of our  
09:05:38 10 customers, and we have so many people working on doing that  
09:05:40 11 on a daily basis.

09:05:41 12 Q. Now, Mr. Prasad, this slide mentions a company called  
09:05:46 13 Yap; do you see that?

09:05:48 14 A. Yes, I see that.

09:05:49 15 Q. Are you familiar with the company Yap?

09:05:51 16 A. Yes, I'm familiar with Yap.

09:05:55 17 Q. Did Amazon take Yap's technology?

09:05:56 18 A. No, Amazon acquired Yap's technology by paying for it.

09:06:01 19 Q. Did, in fact, Amazon buy the company Yap?

09:06:03 20 A. Yes, Amazon bought the company Yap.

09:06:06 21 Q. And the slide mentions another company Nuance. Are you  
09:06:10 22 familiar with Nuance?

09:06:11 23 A. Yes, I'm familiar with Nuance.

09:06:12 24 Q. Did Amazon take Nuance's technology?

09:06:14 25 A. No, we licensed Nuance's technology.

09:06:16 1 Q. Does Amazon have any patents of its own that relate to  
09:06:28 2 Alexa?

09:06:28 3 MR. HADDEN: You can take this down, Mr. Berk.

09:06:30 4 A. Yes, we have hundreds of patents. Last I looked we  
09:06:35 5 have over 400 patents related to Alexa.

09:06:38 6 Q. (By Mr. Hadden) And are you proud of the work that you  
09:06:40 7 and all those engineers at Amazon have done to develop  
09:06:43 8 Alexa?

09:06:43 9 A. Yeah, I'm incredibly proud. I consider Alexa my  
09:06:51 10 biggest achievement in my career and so does thousands and  
09:06:58 11 thousands of people working on Alexa. The fact that we  
09:06:58 12 brought, as I mentioned, what was science fiction from Star  
09:07:00 13 Trek based, in the hands of millions of people, is deeply  
09:07:03 14 fulfilling. And I -- and I love the fact that I can still  
09:07:06 15 come in every day and invent on behalf of our customers.

09:07:09 16 Q. Are you familiar with a concept called DEV, or  
09:07:15 17 downstream economic value, as that term is used at Amazon?

09:07:20 18 A. Yes, I'm familiar.

09:07:21 19 Q. And does DEV include the profit or loss for the  
09:07:25 20 underlying device like the Echo?

09:07:27 21 A. No, it does not.

09:07:27 22 Q. Are you familiar with a term called LTV, or lifetime  
09:07:33 23 value, that's used at Amazon?

09:07:34 24 A. Yes, I'm familiar.

09:07:35 25 Q. And does LTV include the profit or loss on that

09:07:40 1 underlying device like an Echo?

09:07:41 2 A. Yes, it does.

09:07:42 3 Q. And is that a difference between DEV and LTV?

09:07:48 4 A. Yes, it's one of the differences between the two.

09:07:50 5 MR. HADDEN: Pass the witness.

09:07:51 6 THE COURT: Cross-examination by the Plaintiff.

09:08:23 7 Proceed when you're ready, Mr. Baxter.

09:08:27 8 MR. BAXTER: Thank you, Your Honor.

09:08:27 9 CROSS-EXAMINATION

09:08:27 10 BY MR. BAXTER:

09:08:27 11 Q. Mr. Prasad, welcome to Marshall.

09:08:32 12 A. Thank you. Good morning.

09:08:33 13 Q. You and I have something in common. My youngest  
09:08:37 14 daughter is from Karnataka, India. You know where that is?

09:08:40 15 A. Did you mean Karnataka?

09:08:41 16 Q. If you say it that way, I'm going to take your word for  
09:08:45 17 it.

09:08:45 18 I just never did teach her to eat Indian food.  
09:08:53 19 She says it's too hot.

09:08:56 20 Let me talk to you, if I could, Mr. Prasad, about  
09:08:59 21 the meeting between Amazon and Dr. Li in 2011, okay?

09:09:04 22 A. Okay.

09:09:05 23 Q. You're not there.

09:09:06 24 A. I wasn't there.

09:09:07 25 Q. You don't know anything about it.

09:09:09 1 A. No, I don't know anything about it.

09:09:10 2 Q. You don't know what information Dr. Li brought to  
09:09:14 3 Amazon.

09:09:14 4 A. No, I don't, other than what was captured in my notes.

09:09:19 5 Q. Okay. Well, your notes said there was a meeting, but  
09:09:23 6 you don't have any details of the meeting, do you?

09:09:25 7 A. No, I don't have any details of that meeting.

09:09:28 8 Q. So who from Amazon is going to come and say, I was at  
09:09:33 9 the meeting, and look the jury in the eye and say, here's  
09:09:37 10 what happened? It's not you? Is it your colleague over  
09:09:42 11 here, Mr. Hilmes, was he there?

09:09:45 12 A. I don't know whether Mr. Hilmes was there, but I know  
09:09:48 13 for a fact that a couple of people have already testified  
09:09:51 14 who were at that meeting, or going to.

09:09:53 15 Q. Okay. I want to know who's going to come in this  
09:09:57 16 courtroom and look the jury in the eye and say, here's what  
09:10:01 17 happened at the meeting, anybody?

09:10:02 18 A. I don't know whether because we are in unprecedented  
09:10:05 19 circumstances with COVID whether physically someone is  
09:10:10 20 coming, but I'm assuming video calls and other facilities  
09:10:13 21 are available for the right set of people to be helping you  
09:10:17 22 with this matter.

09:10:17 23 Q. So you think there's going to be a video call in this  
09:10:22 24 trial and people are going to help us with this matter?

09:10:24 25 A. Already recorded testimony.



09:10:25 1 Q. Okay. As far as you know then, no one is going to come  
09:10:30 2 and personally sit in the stand where you are and tell the  
09:10:34 3 jury what happened at the meeting, except for Dr. Li, of  
09:10:37 4 course, right?

09:10:38 5 A. I don't know of that. I'm pretty sure someone is  
09:10:40 6 coming to -- virtually or physically, I'm not sure.

09:10:44 7 Q. Okay.

09:10:44 8 A. But virtually someone can help with this matter.

09:10:47 9 Q. Well, virtually means we can ask them questions on the  
09:10:53 10 spot, right, be it on the Zoom or Twitter or something,  
09:10:56 11 right?

09:10:56 12 A. I think in these unusual circumstances, we are all  
09:10:59 13 trying to work in the best way possible. So that is  
09:11:02 14 definitely an option in my mind.

09:11:03 15 Q. Okay. We know, until we hear contrary, that there was  
09:11:12 16 a meeting, and two groups got intermingled at that meeting,  
09:11:17 17 right, Group B and Group D?

09:11:20 18 A. I have no knowledge of who was at that meeting, what  
09:11:23 19 was discussed, and what got mingled versus not.

09:11:26 20 Q. Okay. Well, if Dr. Li testified that his former  
09:11:28 21 employee, another Mr. Li who worked in Group D, and this  
09:11:33 22 was a meeting with Group B, came to that meeting, you don't  
09:11:35 23 know the difference, do you?

09:11:37 24 A. No, I don't know which other Dr. Li you're mentioning  
09:11:41 25 here.

09:11:41 1 Q. Okay. And -- and that's against the rules to mix those  
09:11:43 2 groups, is it not?

09:11:44 3 A. I don't know what you're talking about because --

09:11:47 4 Q. Okay.

09:11:48 5 A. -- this predates my time at Amazon.

09:11:51 6 Q. All right. We do know from Dr. Li that at the meeting,  
09:11:57 7 he discussed with the Amazon people there, noise  
09:12:04 8 suppression, sound suppression, don't we?

09:12:06 9 A. I don't know that other than the brief mention Dr. Li  
09:12:09 10 gave to me in my interview with him for my job role I was  
09:12:13 11 looking to hire someone for.

09:12:15 12 Q. If he testified in this case under oath that he talked  
09:12:18 13 to Amazon about that, you don't know anything different, do  
09:12:21 14 you?

09:12:21 15 A. I don't know -- I don't know anything on that --  
09:12:25 16 whether -- I don't know what his testimony is, so I'm just  
09:12:29 17 coming here to help you with the matter of what I know in  
09:12:33 18 this case.

09:12:33 19 Q. If he said that he talked to Amazon about far-field  
09:12:36 20 technology, you don't know the difference, do you?

09:12:38 21 A. I know the difference between far-field technology, as  
09:12:42 22 I mentioned, versus the patent in this case, which is the  
09:12:46 23 microphone array.

09:12:46 24 Q. Mr. Prasad --

09:12:48 25 A. As I mentioned --

09:12:49 1 Q. -- Mr. Prasad, I mean not to interrupt you, sir. But  
09:12:52 2 if you'll listen to my question.

09:12:53 3           You don't know of your own knowledge whether or  
09:12:56 4 not he talked to the Amazon engineers about far-field  
09:12:58 5 technology or not, do you?

09:13:00 6 A. I don't, but --

09:13:03 7 Q. Okay. Do you know if he talked to them about a  
09:13:08 8 circular mic array?

09:13:10 9 A. I don't know that.

09:13:10 10 Q. Do you know if he talked to them about beamforming  
09:13:13 11 technology?

09:13:13 12 A. I don't know for sure. There is some indication in the  
09:13:17 13 notes that it could be beamforming, but I can't tell.

09:13:21 14 Q. You don't know?

09:13:21 15 A. I don't know.

09:13:22 16 Q. Okay. Do you know why, after all that he told Amazon  
09:13:28 17 with a slide presentation, that they contacted him days  
09:13:31 18 later and said: We'd like to have your slide presentation.  
09:13:35 19 Will you send it to us?

09:13:37 20 A. Can you repeat the question because I don't know  
09:13:40 21 whether you're asking me a question there.

09:13:42 22 Q. Yes. At the meeting with Amazon, Dr. Li brought a  
09:13:45 23 slide presentation, a PowerPoint with him, okay? That's --  
09:13:52 24 that's the sworn testimony in this case. And it's further  
09:13:55 25 true that a few days later, Amazon contacted Dr. Li and

09:14:00 1 said: Would you send us those PowerPoint that you showed  
09:14:03 2 us at the meeting?

09:14:06 3 Do you know about that?

09:14:07 4 A. I don't know about that.

09:14:08 5 Q. Okay. You have no information one way or another?

09:14:11 6 A. No, I don't.

09:14:12 7 Q. Would it be highly unusual for Amazon to say: I'm not  
09:14:17 8 interested in your technology, sir; oh, but by the way  
09:14:21 9 would you send us your PowerPoints?

09:14:24 10 Would that be unusual?

09:14:25 11 A. Again, I wasn't there. I can tell you what the policy  
09:14:28 12 would be. When we engage with any -- anybody who's coming  
09:14:32 13 with the intent to collaborate with us in these kind of  
09:14:36 14 settings, we have a mutual NDA, mutual non-disclosure  
09:14:41 15 agreement. And all the artifacts that are discussed are  
09:14:43 16 discussed within the confines of that NDA.

09:14:47 17 I'm not a lawyer, but with that, we -- we have  
09:14:49 18 great interest in preserving the intellectual property of  
09:14:51 19 this nation, that process.

09:14:54 20 And, as I mentioned, we -- if we feel there's  
09:14:57 21 something valuable, we will end up collaborating in the  
09:15:00 22 ways of either licensing the technology or if in certain  
09:15:04 23 situations an acquisition makes sense, then we'll pay for  
09:15:10 24 it. So that's our policy. So I don't know what -- what  
09:15:14 25 more I can add there.

09:15:15 1 Q. Well, you can add why Amazon, if they weren't  
09:15:19 2 interested in Dr. Li's technology, days later sent for all  
09:15:24 3 of his PowerPoint slides so they could study them. Can you  
09:15:26 4 enlighten us on that?

09:15:26 5 A. I wasn't there. I don't understand what -- don't know  
09:15:27 6 what was discussed, so I -- I'm not the best person to  
09:15:30 7 discuss that.

09:15:31 8 Q. Okay. Who is the best person to discuss that?

09:15:33 9 A. The people who are going to testify -- all the other  
09:15:39 10 witnesses who are here to help like me.

09:15:40 11 Q. Now, I believe that you talked about the email that you  
09:15:48 12 said you didn't get -- and -- and let me --

09:15:52 13 MR. BAXTER: If I can get that email up -- I think  
09:15:54 14 it's 96. And I was wondering why we didn't start at the  
09:16:03 15 top. Can you blow that up for me? The first two -- the  
09:16:07 16 first two. There you go.

09:16:09 17 Q. (By Mr. Baxter) It says -- Mr. -- Dr. Li says to your  
09:16:18 18 colleague at Amazon: Hi, Lexie, thanks a lot. Peter.

09:16:24 19 And what he is thanking her for is that she said:  
09:16:26 20 I just forwarded your message to Rohit.

09:16:29 21 Is that you?

09:16:29 22 A. Yeah, that's me.

09:16:30 23 Q. Okay. Any reason you think that she lied to Dr. Li  
09:16:34 24 about that?

09:16:35 25 A. I don't know whether -- what -- whether she lied or

09:16:37 1 not. You have to talk to Lexie about it. I can tell you  
09:16:41 2 that I have no memory of getting this email.

09:16:43 3 Q. So you have amnesia about getting the email, but you're  
09:16:47 4 not saying you didn't get it if, in fact, she said she sent  
09:16:50 5 it to you?

09:16:51 6 A. I don't have amnesia. I'm just saying I have no memory  
09:16:57 7 of getting this email.

09:16:58 8 Q. Okay. But no reason to believe that she didn't forward  
09:17:00 9 it to you?

09:17:03 10 A. She -- you know, you get emails -- a lot of emails.  
09:17:08 11 She may have intended to forward. You will have to ask  
09:17:11 12 Lexie whether she remembers forwarding this email. I  
09:17:15 13 didn't get an email, as far as I know.

09:17:18 14 Q. Well, no, it's not that you don't know if you got it or  
09:17:22 15 not, you can't remember one way or another, can you?

09:17:24 16 A. Yeah, I can't remember.

09:17:26 17 Q. Okay. So in the email that she sent you --

09:17:29 18 MR. BAXTER: If we can scroll up.

09:17:32 19 Q. (By Mr. Baxter) -- Dr. Li said: It was nice to have  
09:17:35 20 met you at the launch party in November of 2014.

09:17:37 21 Right?

09:17:38 22 A. Yes.

09:17:38 23 Q. All right.

09:17:40 24 MR. BAXTER: Next -- next portion.

09:17:42 25 Q. (By Mr. Baxter) He told you about Dr. Zhu, right? And

09:17:53 1 then he says in October of 2011: We accepted an invitation  
09:17:58 2 from Amazon's Lab126.

09:18:00 3 Now, that would indicate to you, would it not,  
09:18:03 4 that he didn't contact Amazon, but Amazon contacted him,  
09:18:09 5 right?

09:18:09 6 A. Yes.

09:18:10 7 Q. Okay. And that he then tells you that he's got several  
09:18:16 8 U.S. patents on a circular microphone array, he's got  
09:18:23 9 pending patents on far-field voice control/search, and that  
09:18:27 10 he believes that it would be useful for you two to get  
09:18:33 11 together and discuss a solution to the problem of he's got  
09:18:38 12 patents where the Echo has tread. Would that be fair?

09:18:42 13 A. That's what's written here.

09:18:45 14 Q. Okay. Now, Amazon, I believe we've heard from  
09:18:50 15 witnesses, has a policy that they don't want engineers like  
09:18:53 16 you looking at patents, right?

09:18:54 17 A. I -- I'll state the policy, because that's -- the  
09:19:01 18 question was not very specific --

09:19:04 19 Q. Well, let me ask you a specific question, then,  
09:19:06 20 Dr. Prasad -- Mr. Prasad.

09:19:08 21 Does, in fact, Amazon tell you not to read other  
09:19:12 22 companies' patents?

09:19:13 23 A. No. The policy is the following. We -- if there is  
09:19:17 24 any allegation or any patent that is sent our way, we are  
09:19:21 25 asked to engage with the patent attorneys, because as I

09:19:24 1 mentioned, they are very skilled in making a technical  
09:19:27 2 determination, too. And then, as needed, they will engage  
09:19:30 3 with us on answering any technical questions.

09:19:34 4 They are doing their job. Our job as engineers  
09:19:37 5 and scientists is to invent. It's their job as the patent  
09:19:40 6 attorneys to make sure the right outcomes are coming across  
09:19:46 7 with intellectual property. And that's our policy.

09:19:47 8 Q. The policy is for you not to read the patent but to  
09:19:51 9 send it on to somebody else; is that right?

09:19:53 10 A. That's correct.

09:19:54 11 Q. Okay. And, in this case, even though you got an email  
09:20:01 12 apparently that said he's got patents, you didn't send it  
09:20:04 13 on to the lawyers, and you didn't communicate with him at  
09:20:08 14 all; is that right?

09:20:10 15 A. That's not correct, because I don't have any  
09:20:13 16 recollection or memory of getting this email.

09:20:15 17 Q. I understand that, Mr. Prasad, that you, in fact, don't  
09:20:19 18 remember. But that doesn't mean you didn't get it, does  
09:20:22 19 it?

09:20:22 20 A. It also doesn't mean that I got it.

09:20:25 21 Q. Well, we know that your colleague said that she sent it  
09:20:29 22 to you. No reason to think that she didn't. And you're  
09:20:33 23 just now can't remember, right?

09:20:35 24 A. I can't remember.

09:20:36 25 Q. All right. But we do know this, you did not forward



09:20:40 1 anything to anybody else, right?

09:20:43 2 A. I don't have any memory, so I don't know what  
09:20:46 3 subsequently happened with this.

09:20:48 4 Q. And you didn't read the patents?

09:20:49 5 A. No, I only read the patent as part of this trial.

09:20:53 6 Q. Okay. And Amazon, in fact, has a policy for you  
09:20:57 7 engineers not to read the patents but to forward it on  
09:21:00 8 somewhere in the ether, right?

09:21:05 9 A. I think that's an extreme characterization of the  
09:21:10 10 policy. As I mentioned, they will get us to read the --  
09:21:12 11 the patent, as -- in this case -- when this case was  
09:21:16 12 opened, Mr. Phil Hilmes, it's my understanding, read the  
09:21:16 13 patent and determined that the patent is not how we process  
09:21:16 14 audio.

09:21:24 15 Q. Mr. Prasad --

09:21:25 16 MR. BAXTER: I'll ask to strike that answer,  
09:21:27 17 Your Honor. It's non-responsive.

09:21:28 18 THE COURT: I'll sustain that it's non-responsive.  
09:21:34 19 I'll preserve the part of the answer that says: I think  
09:21:36 20 that's an extreme of the policy as I mentioned. The  
09:21:40 21 remainder of the answer is non-responsive, and I'll strike  
09:21:43 22 it.

09:21:43 23 Next question.

09:21:45 24 MR. BAXTER: Thank you, Your Honor.

09:21:45 25 Q. (By Mr. Baxter) Now, you already knew Dr. Li, did you

09:21:50 1 not, Mr. Prasad?

09:21:52 2 A. No, I didn't know him, other than the interview that I  
09:21:56 3 did with him on the phone. So I hadn't met him in person  
09:22:01 4 before that.

09:22:01 5 Q. Had you ever talked to him?

09:22:03 6 A. No, I only spoke with him at the -- at the phone  
09:22:06 7 interview I mentioned.

09:22:07 8 Q. You had never worked on a project with him?

09:22:10 9 A. Not to my recollection.

09:22:13 10 Q. Not even at your previous company?

09:22:15 11 A. No, I don't remember working with Dr. Li.

09:22:22 12 MR. BAXTER: Can you get me up the white paper,  
09:22:24 13 please, sir?

09:22:27 14 Q. (By Mr. Baxter) Let me show you this demonstrative, if  
09:22:30 15 I could, Mr. Prasad.

09:22:32 16 This is a Concept White Paper about a robust  
09:22:37 17 two-way translator. Is that what you worked on at your  
09:22:41 18 prior business?

09:22:41 19 A. Yes, I worked on two-way translator. But there were  
09:22:45 20 many other efforts. This is one particular white paper.

09:22:51 21 Q. And do you see it was submitted by Li Creative  
09:22:53 22 Technology by Dr. Li?

09:22:54 23 A. Yes, I see that.

09:22:55 24 Q. All right.

09:22:58 25 MR. BAXTER: Can we go to Page 2? Next page --

09:23:04 1 I'm sorry, Page 2.

09:23:06 2 A. Can you give me a minute to go back to the first page?

09:23:12 3 Q. (By Mr. Baxter) Oh, yes, sir, absolutely. Be glad for  
09:23:12 4 you to look at it all you want to. Do you want to see the  
09:23:17 5 second -- the next page?

09:23:17 6 A. No, I want to see the cover sheet -- sorry, I want to  
09:23:19 7 see the cover page because who the -- what the BA -- the  
09:23:22 8 Broad Agency Announcement is here. Yes. Thank you.

09:23:33 9 MR. BAXTER: Can we now go to Page 2?

09:23:38 10 Q. (By Mr. Baxter) Do you see that --

09:23:39 11 A. Can I interrupt? I want to see the date for it.

09:23:43 12 Q. All right. I'm not sure it's on this first page, but I  
09:23:57 13 think if we get around to Page 3 we can figure it out.

09:24:01 14 A. Okay. Thank you.

09:24:03 15 THE COURT: Let's get back to questions and  
09:24:04 16 answers, please.

09:24:06 17 MR. BAXTER: Thank you.

09:24:07 18 Q. (By Mr. Baxter) You see the key personnel would be  
09:24:10 19 Dr. Li from Li Creative Technologies; do you see that?

09:24:12 20 A. Yes, I do.

09:24:12 21 MR. BAXTER: Go to Page 3.

09:24:14 22 Q. (By Mr. Baxter) Now, Raytheon BBN Technologies is part  
09:24:20 23 of this program, and there you are --

09:24:22 24 A. Yes.

09:24:22 25 Q. -- is that right? And it says you're going to be the

09:24:25 1 principal investigator; do you see that?

09:24:33 2 A. Yes, I see that.

09:24:34 3 Q. And you know that you had a conference call with Dr. Li  
09:24:37 4 about this project, and you talked about it when he said  
09:24:40 5 would you be part of this presentation to DOD. Do you  
09:24:45 6 remember that?

09:24:46 7 A. I don't remember that, but that's possible because this  
09:24:50 8 paper is co-authored.

09:24:52 9 Q. And so you, in fact, knew Dr. Li before he came to  
09:24:56 10 Amazon in 2011 and before you interviewed him in 2014,  
09:25:02 11 right?

09:25:02 12 A. No, that would be -- I -- we may have collaborated on  
09:25:06 13 this white paper, but as I was running many large programs,  
09:25:10 14 as I mentioned in my time at BBN, which is my former  
09:25:16 15 employer where I worked 14 years, we had several hundreds  
09:25:24 16 of subcontractors, small businesses that would reach out  
09:25:24 17 for collaboration.

09:25:25 18 This, as far as I remember now after looking at  
09:25:27 19 this artifact, is one of those collaborative effort where a  
09:25:31 20 small business for a U.S. Army project was asked -- was  
09:25:35 21 looking to collaborate with us. I don't know the full  
09:25:37 22 context of which particular white paper this was. I don't  
09:25:41 23 think this was funded, for instance.

09:25:43 24 We submit -- at that point, I had a very large  
09:25:46 25 team, and we would submit many different white papers, and

09:25:49 1 I was the resident expert on -- as I mentioned, on  
09:25:53 2 speech-to-speech translation. But I have a massive team.  
09:25:57 3 So I may have spoken with Dr. Li on the phone again, but I  
09:26:09 4 don't recall meeting him in person.

09:26:09 5 Q. Now, after the interview, you're not the only one that  
09:26:09 6 Dr. Li interviewed for a job at Amazon, were you?

09:26:09 7 A. Can you say that again?

09:26:10 8 Q. You were not the only person to interview Dr. Li for a  
09:26:13 9 job at Amazon, were you?

09:26:15 10 A. I'm not sure about that. I did recommend that he speak  
09:26:19 11 with our audio team after my interview. Even though I was  
09:26:23 12 not inclined for my role, I didn't want to have a false  
09:26:27 13 rejection, and I wanted to make sure he connects with the  
09:26:30 14 right set of individuals.

09:26:32 15 Q. Well, we know that he talked to your colleague over  
09:26:35 16 here at the table, do we not? In fact, he recommended  
09:26:38 17 hiring him, didn't he?

09:26:41 18 A. I don't know what Mr. Hilmes, if you're referring to  
09:26:43 19 him, recommended.

09:26:44 20 Q. Do you remember that on the notes it said he was  
09:26:49 21 inclined to hire him?

09:26:50 22 A. I -- I haven't seen that. Like, I mean, if you put  
09:26:53 23 me -- as I mentioned, if you put -- these decisions are  
09:26:58 24 recorded on internal systems. If you show me that, I can  
09:27:01 25 answer, but I don't -- I didn't go and look that up.

09:27:04 1 MR. BAXTER: Can you get the notes up? I think  
09:27:06 2 it's PX-130 on our list. And go to the second page.  
09:27:18 3 Q. (By Mr. Baxter) See up here where it says "inclined,"  
09:27:26 4 phone interview with Phil Hilmes, inclined; do you see  
09:27:31 5 that?  
09:27:31 6 A. Yes, I see that.  
09:27:32 7 Q. So he was inclined to hire him; is that right?  
09:27:35 8 A. He was inclined -- just to be very clear -- phone  
09:27:40 9 screens -- this is a phone interview. Doesn't mean you're  
09:27:42 10 inclined -- we're just simply -- phone screens means you go  
09:27:45 11 to the next step, which is a formal interview.  
09:27:48 12 Q. So he was inclined to do that?  
09:27:50 13 A. Yes, he was.  
09:27:51 14 Q. But you nixed that?  
09:27:55 15 A. Sorry?  
09:27:55 16 Q. Your -- your decision was not to do that?  
09:27:57 17 A. Yeah, my decision was, for my role, I did not see a  
09:28:01 18 fit, and that's why I was not inclined for my roles.  
09:28:04 19 Q. Now, you told your counsel about two companies, one of  
09:28:08 20 them called Nuance; do you remember that?  
09:28:10 21 A. Yes.  
09:28:10 22 Q. And -- and the allegation was that Amazon gets in small  
09:28:16 23 companies and takes their technology and doesn't pay them  
09:28:20 24 for it. Is that what you were responding to?  
09:28:24 25 A. No, I was asking -- I was responding to the counsel's

09:28:27 1 specific questions.

09:28:27 2 Q. Okay. Who is the CEO of Amazon?

09:28:29 3 A. Mr. Bezos.

09:28:35 4 Q. And did you see him testify under oath before Congress  
09:28:37 5 on this very issue?

09:28:39 6 A. I saw parts of it but not the whole of it.

09:28:42 7 Q. Did you see where he said mistakes had been made?

09:28:45 8 A. No, I did not see. As I mentioned, I only saw -- I was  
09:28:48 9 working.

09:28:50 10 MR. BAXTER: That's all I have, Your Honor. Thank  
09:28:52 11 you very much.

09:28:52 12 THE COURT: You pass the witness? Mr. Baxter, you  
09:28:57 13 pass the witness?

09:28:58 14 MR. BAXTER: Oh, I do, Your Honor. Yes, sir.

09:28:59 15 THE COURT: Is there additional direct,  
09:29:02 16 Mr. Hadden?

09:29:02 17 MR. HADDEN: Just briefly, Your Honor.

09:29:03 18 THE COURT: All right. Proceed with your  
09:29:05 19 redirect.

09:29:06 20 MR. HADDEN: Thank you, Your Honor.

09:29:07 21 Can we get Plaintiff's 131 up again, please,  
09:29:11 22 Mr. Berk? Can we go to the next page and the paragraph  
09:29:20 23 that says "our company holds several patents," can you just  
09:29:25 24 blow up that paragraph?

09:29:25 25 REDIRECT EXAMINATION

09:29:27 1 BY MR. HADDEN:

09:29:27 2 Q. Now, Vocalife's counsel was asking you about this  
09:29:31 3 paragraph, suggesting that Dr. Li said there was a problem.

09:29:38 4 MR. HADDEN: Can we blow up the language -- the  
09:29:41 5 last sentence?

09:29:50 6 Q. (By Mr. Hadden) Now, in this email, Dr. Li says: We  
09:29:53 7 believe our patents and technology will be very useful to  
09:29:56 8 Amazon's business, to extend your patent portfolio, and to  
09:29:59 9 protect your products.

09:30:03 10 Do you see that?

09:30:03 11 A. Yes, I see that.

09:30:04 12 Q. Does that suggest to you that Dr. Li was saying he had  
09:30:08 13 a problem with Amazon?

09:30:09 14 A. No, not at all.

09:30:10 15 Q. Okay. And is Mr. Hilmes the best or most qualified  
09:30:17 16 person at Amazon to assess the type of technology that's  
09:30:22 17 described in the '049 patent?

09:30:23 18 A. Yes.

09:30:26 19 Q. And is it your understanding that Mr. Hilmes reviewed  
09:30:29 20 that patent right after this lawsuit was filed?

09:30:32 21 A. Yes, he did.

09:30:35 22 MR. HADDEN: No further questions.

09:30:36 23 THE COURT: You pass the witness, Mr. Hadden?

09:30:38 24 MR. HADDEN: I do. Pass the witness, Your Honor.

09:30:40 25 THE COURT: Additional cross?



09:30:42 1 MR. BAXTER: Yes, Your Honor.

09:30:56 2 Can we get the email back up? And go to the  
09:31:01 3 second page.

09:31:01 4 RECROSS-EXAMINATION

09:31:10 5 BY MR. BAXTER:

09:31:10 6 Q. Can you -- do you see the paragraph, Mr. Prasad, where  
09:31:13 7 it says: It is our belief that collaborations are the best  
09:31:17 8 solution to this matter?

09:31:23 9 Does that indicate there's a problem that needs a  
09:31:23 10 solution?

09:31:23 11 A. No, it doesn't, because it's still collaboration, and,  
09:31:32 12 yeah, I don't interpret it that way.

09:31:35 13 Q. So when he told you that he had patents on circular  
09:31:40 14 microphone array and related technologies and he wants to  
09:31:45 15 have a meeting to have a solution to the problem, you  
09:31:51 16 interpret that as sort of no harm, no foul?

09:31:57 17 A. No, I think the real issue is that this email, I don't  
09:32:02 18 have any memory of getting, so it's hypothetical to me. So  
09:32:06 19 I don't -- and plus, I don't read it this way. It's still  
09:32:09 20 collaboration, if you read the entire email.

09:32:11 21 Q. Well, we know that the email was forwarded to you by an  
09:32:14 22 Amazon employee. And we know that you never contacted  
09:32:21 23 Dr. Li to interview him about whatever the problem was or  
09:32:25 24 to see what his patents were or to do anything, did you?

09:32:29 25 A. As I mentioned, the email, I have no memory of, and you

09:32:34 1 have to ask Lexie whether she has -- Ms. Burnham, sorry,  
09:32:38 2 whether she forwarded it.

09:32:39 3 Q. Now, the paragraph that says: Our company holds  
09:32:43 4 several U.S. patents on circular microphone array systems.

09:32:47 5 Do you see that?

09:32:48 6 A. Yes, I see that.

09:32:51 7 Q. Does the Echo work if the microphones don't work?

09:32:54 8 A. No, one -- at least one microphone has to work.

09:33:01 9 Q. So if the microphones don't work, it doesn't make any  
09:33:06 10 difference what's out here in the Cloud because it doesn't  
09:33:10 11 get any information; is that right?

09:33:11 12 A. Yes. One microphone has to work, but not the array.

09:33:19 13 Q. Thank you very much.

09:33:20 14 MR. BAXTER: That's all I have, Your Honor.

09:33:21 15 THE COURT: Is there further direct?

09:33:23 16 MR. HADDEN: No, Your Honor.

09:33:23 17 THE COURT: All right. You may step down,  
09:33:27 18 Mr. Prasad.

09:33:28 19 MR. HADDEN: Can I ask that Mr. Prasad be excused?

09:33:30 20 THE COURT: Any objection?

09:33:31 21 MR. BAXTER: No, Your Honor.

09:33:31 22 THE COURT: Mr. Prasad, you're excused. You're  
09:33:34 23 free to leave, sir; you're free to stay.

09:33:37 24 THE WITNESS: Thank you.

09:33:37 25 THE COURT: Defendants, call your next witness.

09:33:39 1 MR. HADDEN: Amazon calls Mr. Phil Hilmes.

09:33:47 2 THE COURT: If you'll come forward and be sworn,  
09:33:49 3 Mr. Hilmes.

09:33:50 4 (Witness sworn.)

09:33:51 5 THE COURT: Please come around, have a seat on the  
09:34:01 6 witness stand.

09:34:11 7 MS. DOAN: Your Honor, may I approach?

09:34:13 8 THE COURT: You may distribute binders.

09:34:26 9 All right. Counsel, you may proceed with your  
09:34:29 10 direct examination.

09:34:29 11 MR. HADDEN: Thank you, Your Honor.

09:34:29 12 PHILIP HILMES, DEFENDANTS' WITNESS, SWORN

09:34:29 13 DIRECT EXAMINATION

09:34:30 14 BY MR. HADDEN:

09:34:30 15 Q. Good morning, Mr. Hilmes.

09:34:31 16 A. Good morning.

09:34:32 17 Q. Could you also introduce yourself to the jury?

09:34:35 18 A. Yes. My name is Philip Hilmes. I'm the director of  
09:34:40 19 audio technology at Amazon.

09:34:41 20 Q. Do you have any degrees, Mr. Hilmes?

09:34:45 21 A. Yes. I got my high school diploma from my -- from  
09:34:50 22 Wattsville High School where I grew up, and I went to  
09:34:54 23 Harvey Mudd College and got a BS in engineering. And then  
09:34:58 24 I went to the University of Southern California where I got  
09:35:03 25 a Master's degree in electrical engineering.

09:35:04 1 Q. And have you done any research related to audio  
09:35:08 2 technology before your time at Amazon?

09:35:10 3 A. Yes. I've been doing research in audio for over 20  
09:35:17 4 years now. Started when I was in college, and -- and then  
09:35:24 5 during my first job and probably my most focused research  
09:35:27 6 was when I went back to U.S.C. as a research associate and  
09:35:34 7 started researching various audio-processing technologies.

09:35:43 8 One of the ones that I first started off in was  
09:35:44 9 called room equalization technology. So it's when you take  
09:35:48 10 like a loud speaker and put it in a room, and then we -- we  
09:35:54 11 would have mic -- a microphone array in the room and  
09:35:58 12 capture the sound from that loud speaker and figure out how  
09:36:01 13 to optimize the sound so that we make the -- the loud  
09:36:05 14 speaker in the room sound better and remove all the, you  
09:36:09 15 know, ways that the room and the loud speaker color the  
09:36:13 16 sound, and so you get something that more closely matches  
09:36:16 17 what the music producer intended.

09:36:18 18 And we've researched other things, too; something  
09:36:21 19 called virtual microphones where we took, you know, the  
09:36:26 20 sound that was recorded on one piece of music by a  
09:36:30 21 microphone and then adaptively filtered it to make it sound  
09:36:35 22 like another microphone in the room. And then musicians  
09:36:41 23 could take those virtual microphones, remix them to make  
09:36:45 24 new multichannel recordings for music.

09:36:48 25 Q. When did you join Amazon, Mr. Hilmes?

09:36:51 1 A. December 2012.

09:36:53 2 Q. And what are your responsibilities at -- as director of  
09:36:58 3 audio technology at Lab126?

09:37:00 4 A. So as director of audio technology, I'm responsible for  
09:37:06 5 the hardware development of the audio components. That  
09:37:11 6 means like the loud speaker, the microphones, microphone  
09:37:14 7 array, and other audio hardware components in the devices.

09:37:20 8 I also have a lot of scientists on my team who are  
09:37:25 9 responsible for coming up with algorithms that do audio  
09:37:28 10 processing on the device. This is both for the input, as  
09:37:32 11 well as for the output. And, you know, making it sound  
09:37:35 12 good on the output for customers, and also for, you know,  
09:37:41 13 basically Alexa to hear the voice better and for you to  
09:37:46 14 make phone calls with Alexa devices so that, you know,  
09:37:51 15 people you call can hear you better, too.

09:37:53 16 And then I also have software engineers on the  
09:37:55 17 team who write the software code that implements those  
09:38:01 18 algorithms.

09:38:01 19 Q. And you mentioned your team. How many engineers and  
09:38:04 20 scientists are on your team at Amazon?

09:38:06 21 A. I have a little over 115 right now.

09:38:08 22 Q. And what were your responsibilities at Amazon when you  
09:38:14 23 joined in 2012?

09:38:15 24 A. They were about the same. I didn't have as much of the  
09:38:21 25 hardware part of it. I was mostly focused on the

09:38:23 1 algorithms and software. I had a much smaller team back  
09:38:26 2 then.

09:38:26 3 Q. And are you an inventor on patents?

09:38:28 4 A. Yes.

09:38:29 5 Q. How many patents do you have?

09:38:30 6 A. I have over 40 patents.

09:38:34 7 Q. And are many of those from your work at Amazon?

09:38:37 8 A. Yes. I believe 35 of those patents are from my work at  
09:38:42 9 Amazon.

09:38:42 10 Q. And when you joined Amazon in 2012, what was the status  
09:38:49 11 of the design of the Echo at that point?

09:38:53 12 A. So when I got there in 2012, the existing team there  
09:38:59 13 had already done a couple iterations of the hardware. So  
09:39:04 14 the first Echo device -- they had a prototype that looked  
09:39:09 15 pretty much like what we sold when we first came out with  
09:39:13 16 it. And so that was -- had been built, and -- and then  
09:39:21 17 kind of some of the initial software had also been  
09:39:24 18 completed at that point.

09:39:25 19 Q. And what was the state of the audio processing  
09:39:27 20 algorithms at that point in 2012 when you joined?

09:39:30 21 A. We had the -- the -- kind of the basics of it down. We  
09:39:37 22 had designed the beamformer and the echo canceler and had  
09:39:43 23 kind of done initial versions of those.

09:39:45 24 Q. And do those basic algorithms -- are those still the  
09:39:50 25 basis for the algorithms that are used in the Echos today?

09:39:53 1 A. Yes, that's correct. They have not changed. I mean,  
09:39:56 2 we've made small improvements to them over time, but the  
09:40:02 3 core of those algorithms is still there today.

09:40:05 4 Q. And what kind of audio processing algorithms do the  
09:40:08 5 Echo devices use?

09:40:10 6 A. Well, we do several things, but I think the -- kind of  
09:40:19 7 the fundamental ones, the big ones are we do fixed  
09:40:24 8 beamforming, and we do acoustic echo cancellation.

09:40:26 9 Q. Okay. And is there something that Amazon uses called a  
09:40:30 10 super directive beamformer?

09:40:31 11 A. Yeah, yeah, that's a type of fixed beamformer. That's  
09:40:35 12 the super directive fixed beamformer.

09:40:37 13 Q. And was the decision to use a super directive  
09:40:41 14 beamformer, had that already been made at the time that you  
09:40:45 15 joined in 2012?

09:40:46 16 A. Yes, it was made well before then.

09:40:48 17 Q. And we talked a lot about beams. What is a beam?

09:40:53 18 A. So what we mean by a beam is we have some sort of  
09:41:01 19 microphone array, meaning more than one microphone, and we  
09:41:05 20 basically multiply some numbers to the incoming sound that  
09:41:13 21 suppress or kind of, you know, reduce the sound coming from  
09:41:17 22 certain directions. And then kind of let through sound  
09:41:21 23 coming in, you know, this one direction. So -- and we call  
09:41:25 24 that the beam.

09:41:26 25 Q. You mentioned that the Echos used fixed beams; is that

09:41:30 1 right?

09:41:30 2 A. Yes, that's correct.

09:41:31 3 Q. And so what is a fixed beam?

09:41:34 4 A. A fixed beam means that those numbers I was talking  
09:41:36 5 about, we call them the coefficients that make up that  
09:41:41 6 beam, they don't change. They -- they -- they're fixed.

09:41:47 7 Q. Do you have some demonstratives to help explain how  
09:41:50 8 this audio processing works in an Echo?

09:41:52 9 A. Yes, I do.

09:41:53 10 MR. HADDEN: If we can get those up, please,  
09:41:55 11 Mr. Berk.

09:42:02 12 A. Yeah, so this is a picture of the Echo Dot, the 1st  
09:42:06 13 Generation. And taking this apart, you can see the top  
09:42:15 14 plastic piece. It's got the holes in there. It's got a  
09:42:18 15 hole in the middle, and then a bunch of little holes around  
09:42:20 16 the edge. That's -- that's what the microphones pass  
09:42:23 17 through. And this board here with the green circles around  
09:42:27 18 them show the little tiny microphones that we have put on  
09:42:29 19 the board that pick up the sound.

09:42:33 20 Q. (By Mr. Hadden) And now this particular device has  
09:42:36 21 seven microphones; is that right, Mr. Hilmes?

09:42:40 22 A. Yeah, that's correct. The original Echo, as well as a  
09:42:43 23 few other versions, had seven microphones. But it varies  
09:42:48 24 from product-to-product. Anywhere from two to eight  
09:42:53 25 microphones are in our products today.



09:42:55 1 Q. Does Amazon also have an Echo product with only one  
09:43:01 2 microphone?

09:43:01 3 A. Yes, it's called the Amazon Tap.

09:43:03 4 Q. There -- can you explain to the jury how this  
09:43:11 5 beamforming works using this example of the Echo Dot with  
09:43:15 6 seven microphones?

09:43:17 7 A. Yes. So, basically, these seven microphones are always  
09:43:24 8 recording sound constantly and are capturing the sound.  
09:43:35 9 And once the sound is captured by the seven microphones, we  
09:43:39 10 basically pass it on to the fixed beamformer.

09:43:45 11 And so the fixed beamformer is always making these  
09:43:50 12 beams, here seen in blue. So someone will speak the wake  
09:43:53 13 word "Alexa," that kind of hits the microphones, and each  
09:43:57 14 of the six beams gets -- outputs the audio that it  
09:44:01 15 captures. And we'll kind of go through it here in the  
09:44:05 16 device.

09:44:05 17 The first step that actually happens is the --  
09:44:09 18 yeah, this is -- the high pass filter. And the high pass  
09:44:14 19 filter, it doesn't distinguish between noise or -- or any  
09:44:16 20 other type of sound. It's just -- all it means is like  
09:44:20 21 you've got this spectrum of sound, and it lets the higher  
09:44:29 22 frequencies pass through, and it gets rid of the low  
09:44:32 23 frequencies, whether it's noise, voice, or whatever, it  
09:44:36 24 doesn't really matter, there's no -- it can't distinguish.

09:44:38 25 So we get rid of the low frequencies because we're

09:44:41 1 not interested in that for doing speech recognition.

09:44:43 2 Q. And so what does it do next?

09:44:46 3 A. So after it does that, then it goes to the fixed  
09:44:49 4 beamformer that I've been talking about, and that has the  
09:44:53 5 filter coefficients that basically get applied to the  
09:44:58 6 sound, and -- and then from each of the seven microphones,  
09:45:01 7 and then we output those six beams as shown on that diagram  
09:45:06 8 there.

09:45:07 9 Q. And so in that fixed beamformer, are all seven  
09:45:16 10 microphones used for each beam?

09:45:18 11 A. Yes. Yeah, we use all seven microphones for every  
09:45:21 12 beam.

09:45:21 13 Q. And do you use the same output from those seven  
09:45:25 14 microphones in every beam?

09:45:26 15 A. Yes.

09:45:27 16 Q. And is -- are the output that you use from those seven  
09:45:33 17 microphones, is that taken at the same time?

09:45:37 18 A. Yes, sir, that's correct.

09:45:38 19 Q. And that time sample from those microphones, is that  
09:45:48 20 used to perform all six beams?

09:45:53 21 A. Yes, sir, that's correct.

09:45:54 22 Q. And so after we get to this fixed beamformer, what does  
09:45:57 23 the audio processing algorithm on the Echo do next?

09:46:04 24 A. So after the fixed beamformer, it passes the six beams  
09:46:12 25 to the acoustic echo canceler. And, again, this -- this

09:46:17 1 cancels the Echo from the -- the device.

09:46:18 2 And what that means is, you know, the device can  
09:46:21 3 be playing music or Alexa can be talking, and since the  
09:46:26 4 device knows what that signal is, as it's playing it back,  
09:46:31 5 it gets captured by the microphones. And so we want to --  
09:46:34 6 we want to cancel that signal -- that known signal out. It  
09:46:38 7 doesn't cancel any noise. It only cancels the echo that's  
09:46:44 8 played back.

09:46:45 9 Q. And at this point, is Amazon still using the audio  
09:46:50 10 signals from all six beams?

09:46:53 11 A. Yes, that's correct.

09:46:54 12 Q. And, again, in the fixed beamformer, where you combine  
09:46:57 13 the sounds from the seven different microphones, are the  
09:47:03 14 coefficients that are used to combined those sounds from  
09:47:07 15 the different beams, are those calculated on the device?

09:47:10 16 A. No, sir --

09:47:11 17 MR. FABRICANT: Objection.

09:47:12 18 A. -- they're calculated --

09:47:12 19 THE COURT: Just a -- just a minute.

09:47:14 20 Do you have an objection, counsel?

09:47:16 21 MR. FABRICANT: It's leading, Your Honor.

09:47:17 22 THE COURT: Sustained as to leading.

09:47:19 23 Restate your question in a non-leading form,  
09:47:22 24 counsel.

09:47:22 25 MR. HADDEN: Thank you, Your Honor.

09:47:22 1 Q. (By Mr. Hadden) Where are those coefficients that are  
09:47:25 2 used to combine the microphones calculated?

09:47:27 3 A. They're calculated offline before the product is made.

09:47:32 4 Q. Okay. And when you mean offline, can you explain to  
09:47:34 5 the jury what you mean by that?

09:47:36 6 A. Yeah. We use a scripting language called MATLAB that  
09:47:43 7 we basically design filters in. That script calculates out  
09:47:50 8 the filters and -- which are a bunch of numbers, as I  
09:47:54 9 mentioned. And then we store those numbers on the device  
09:47:56 10 before we ship it.

09:47:58 11 Q. Is there a benefit to Amazon of not calculating those  
09:48:01 12 numbers on the device?

09:48:02 13 A. Oh, yeah, big one. It saves a lot of computational  
09:48:05 14 costs, be very computationally heavy to try and do that on  
09:48:13 15 the device. And so the benefit is, is since we're not  
09:48:15 16 doing that on the device, we can use -- we don't have to  
09:48:21 17 use as expensive of a processor, and -- and so we can save  
09:48:25 18 money on the device.

09:48:26 19 Q. And after we get through the acoustic echo  
09:48:34 20 cancellation, what does the audio processing algorithms on  
09:48:36 21 the device do next?

09:48:37 22 A. So after we've formed the six beams and canceled the  
09:48:43 23 echo in them, we go to what we call the main beam selector.

09:48:48 24 Initially -- our initial design for this kind of  
09:48:53 25 use, the -- just -- just whichever beam had the most energy

09:48:57 1 in it. In later versions we also tried to get a little  
09:49:02 2 smarter, and we tried to measure the noise in the beam  
09:49:05 3 versus the signal. And so we call that the signal-to-noise  
09:49:09 4 ratio.

09:49:14 5 And we tried to -- to choose the one that had  
09:49:17 6 basically -- you know, the most amount of signal, the least  
09:49:19 7 amount of noise, and, you know -- and made sure that it  
09:49:23 8 looked like -- something like speech, and we would send  
09:49:27 9 that out to the wake word -- after that.

09:49:31 10 Q. And we heard some testimony in this case about the  
09:49:33 11 color -- the light ring on the top of the device being a  
09:49:37 12 different color in certain areas. Do you recall that?

09:49:39 13 A. Yes, I do.

09:49:39 14 Q. How does that relate to this beam selection?

09:49:41 15 A. That light indicator is -- is tied to which beam was  
09:49:47 16 selected. So it tells you, okay, you know, this beam was  
09:49:53 17 selected or that beam was selected, approximately.

09:49:57 18 Q. Now, you mentioned this super directive beamformer  
09:50:02 19 algorithm. Was that a new idea at the time that you were  
09:50:06 20 working on the Echo audio processing in 2012?

09:50:09 21 A. No, definitely not. That idea has been around since at  
09:50:13 22 least the '50s, I believe, for radio signals. And -- and  
09:50:22 23 then later, I think in the '60s, applied to microphones.

09:50:24 24 Q. And did the team that was working on the audio  
09:50:34 25 processing algorithms with -- in the Echo, did they look at

09:50:38 1 the literature that existed at that time in the field?

09:50:40 2 A. Oh, yeah. For any algorithm we do, and definitely for  
09:50:47 3 when we were starting out on this challenging project, we  
09:50:51 4 always do a literature search for papers and books and --  
09:50:56 5 and try and, you know, read everything out there that's in  
09:51:02 6 the public domain so that we know, you know, what -- kind  
09:51:06 7 of what's going on in industry and make sure that we can  
09:51:09 8 design and, you know, use that as a starting base for  
09:51:13 9 designing the best solution.

09:51:16 10 Q. And is that the same process you went through when you  
09:51:19 11 were working as a researcher at U.S.C.?

09:51:22 12 A. Yes, that was standard practice. First thing you do,  
09:51:26 13 you see what others have done so you don't try and  
09:51:29 14 re-create the wheel or something.

09:51:32 15 MR. HADDEN: Could we pull up Defendants' 314,  
09:51:35 16 please, Mr. Berk?

09:51:38 17 Q. (By Mr. Hadden) Now, Exhibit 314, do you -- do you  
09:51:46 18 recognize this, Mr. Hilmes?

09:51:50 19 A. Yes. It's an email from Dr. Chhetri, who is on my  
09:51:58 20 team, to several other people at Amazon.

09:52:00 21 Q. And if you look at the second paragraph in the email  
09:52:06 22 from Dr. Chhetri, it says: Our beamformer designs, fixed  
09:52:13 23 beamformer -- do you see --

09:52:14 24 MR. HADDEN: Can you highlight that, please,  
09:52:17 25 Mr. Berk?

09:52:18 1 Q. (By Mr. Hadden) Says: It has mostly followed some of  
09:52:23 2 Brandstein-Ward and Kellermann's work.

09:52:27 3 Do you see that?

09:52:27 4 A. Yes, I do.

09:52:28 5 Q. Do you understand what the reference to Brandstein-Ward  
09:52:32 6 is there?

09:52:32 7 A. Yes, it's referring to the work on microphone arrays.

09:52:34 8 Q. Is that the book that we've seen several times in the  
09:52:36 9 trial so far, Mr. Hilmes?

09:52:38 10 A. Yes, it's that book.

09:52:39 11 Q. Okay. And does Dr. Chhetri report to you?

09:52:42 12 A. Yes, he reports directly to me and has reported to me  
09:52:48 13 since the day I started Amazon and still reports to me  
09:52:51 14 today.

09:52:51 15 Q. And did -- when you joined Amazon in 2012, did you talk  
09:52:56 16 to the existing engineers, like Dr. Chhetri, to get up to  
09:53:02 17 speed on how they were developing the algorithms?

09:53:03 18 A. Oh, yes, definitely. Even though I had worked in the  
09:53:06 19 audio-processing field for many years, at that point, I was  
09:53:12 20 not familiar with all the methods that they were using  
09:53:16 21 and -- or planning on using in the Echo devices. So I  
09:53:21 22 spent a lot of time speaking with Dr. Chhetri and also  
09:53:25 23 reading some of the references that he used.

09:53:28 24 Q. Okay. And does Dr. Chhetri keep a lab notebook at  
09:53:32 25 Amazon?

09:53:33 1 A. Yes, he does. It's something that I brought here  
09:53:41 2 today.

09:53:41 3 Q. And are lab notebooks something that engineers  
09:53:46 4 typically use and maintain at Amazon?

09:53:48 5 A. Yes, it's very common. We try and keep notes of  
09:53:51 6 everything that we do. Some people like to use paper  
09:53:54 7 notebooks. Others use, you know, keep notes on their  
09:54:00 8 computer.

09:54:00 9 But it's very important to keep notes. That's  
09:54:03 10 what every good scientist does so that they can record  
09:54:06 11 their -- their research experiments, what works, what  
09:54:11 12 doesn't work. And, yeah, we try to keep that as a best --  
09:54:16 13 best practice on my team.

09:54:18 14 Q. And does Amazon maintain the possession of those lab  
09:54:22 15 notebooks as part of its business?

09:54:23 16 A. Yes, it does.

09:54:25 17 MR. HADDEN: May I approach, Your Honor, with  
09:54:27 18 PTX- -- or DTX-27P?

09:54:30 19 THE COURT: You may.

09:54:31 20 MR. HADDEN: Thank you, Your Honor.

09:54:40 21 Thank you, sir.

09:54:42 22 THE WITNESS: Thank you, sir.

09:54:43 23 Q. (By Mr. Hadden) I've handed you an exhibit,  
09:54:52 24 Defendants' 27P. Do you have that, Mr. Hilmes?

09:54:55 25 A. Yes, I do.



09:54:56 1 Q. And is this Dr. Chhetri's lab notebook?

09:54:59 2 A. Yes, it is.

09:55:01 3 Q. And if we could look on the second page?

09:55:07 4 MR. HADDEN: Could we please blow that up,

09:55:10 5 Mr. Berk. This is DTX-27.2.

09:55:12 6 Q. (By Mr. Hadden) There's a date here, you see that, it  
09:55:14 7 says Amit, Feb 2011, and then a line. Do you see that,  
09:55:19 8 sir?

09:55:19 9 A. Yes, sir.

09:55:20 10 Q. Does it indicate where the notes from this point have  
09:55:24 11 been -- where Dr. Chhetri is starting his notes?

09:55:28 12 A. Yes.

09:55:28 13 MR. HADDEN: And if we could go to DTX-27.210,  
09:55:41 14 please, Mr. Berk? And could we highlight the date at the  
09:55:43 15 top.

09:55:43 16 Q. (By Mr. Hadden) And there's a date there June 15,  
09:55:46 17 2011. Do you see that, Mr. Hilmes?

09:55:47 18 A. Yes, I do.

09:55:48 19 Q. And does that indicate that that is the pages in  
09:55:51 20 between what we started with and this page were maintained  
09:55:56 21 by Dr. Chhetri during that time period from February to  
09:55:59 22 June of 2011?

09:56:00 23 A. That is correct.

09:56:00 24 Q. And had Dr. Chhetri been studying the super directive  
09:56:12 25 beamformer that's described in that Brandstein book we've

09:56:14 1 talked about before June 2011?

09:56:19 2 MR. FABRICANT: Objection, Your Honor.

09:56:21 3 MR. HADDEN: Can we look at Page --

09:56:23 4 THE COURT: Just a minute. State your objection.

09:56:28 5 MR. FABRICANT: I don't believe the witness has

09:56:31 6 testified that he has personal knowledge about what

09:56:35 7 Dr. Chhetri did. The exhibit is in.

09:56:37 8 MR. HADDEN: I can rephrase the question if you'd

09:56:39 9 like, Your Honor.

09:56:39 10 THE COURT: All right. I'll sustain the

09:56:41 11 objection.

09:56:41 12 You may rephrase. This witness is limited to his

09:56:44 13 personal knowledge.

09:56:45 14 MR. HADDEN: Thank you, Your Honor.

09:56:46 15 Q. (By Mr. Hadden) Can you tell from looking at

09:56:48 16 Dr. Chhetri's lab notebook, in particular at 27.4?

09:56:53 17 MR. HADDEN: Can we see that, please, Mr. Berk?

09:56:55 18 Q. (By Mr. Hadden) That Mr. Chhetri -- or Dr. Chhetri had

09:57:02 19 already been working on the super directive beamformer

09:57:04 20 before June of 2011?

09:57:05 21 A. Yes, that's correct.

09:57:09 22 Q. What does that say at the top of this page?

09:57:14 23 A. It says super directive beamformer.

09:57:16 24 MR. HADDEN: Can we look -- move ahead a few

09:57:18 25 pages, Mr. Berk, to Page 27.12. If you'll blow that up a

09:57:24 1 little bit.

09:57:25 2 Q. (By Mr. Hadden) So what is Dr. Chhetri indicating in  
09:57:28 3 his lab notebook here, Mr. Hilmes?

09:57:30 4 A. So on the left there we have diagrams. Microphone  
09:57:39 5 arrays. You can see the seven-microphone array that we  
09:57:41 6 eventually put into the Echo product. And on the right,  
09:57:44 7 he's listing a whole bunch of references, including the  
09:57:50 8 Brandstein book, and many other people and authors of -- of  
09:57:58 9 books and papers that he referenced in doing his literature  
09:58:04 10 search while working on the -- the beamformer.

09:58:08 11 Q. In that little drawing on the left, does that show a  
09:58:13 12 circular microphone array?

09:58:14 13 A. Yes, it is.

09:58:22 14 Q. Thank you.

09:58:23 15 MR. HADDEN: Can we put up the slide from  
09:58:25 16 Mr. McAlexander's presentation, please, Mr. Berk?

09:58:28 17 Q. (By Mr. Hadden) You've been in this courtroom for the  
09:58:42 18 whole trial, haven't you, Mr. Hilmes?

09:58:44 19 A. Yes, I have.

09:58:44 20 Q. And this is a slide that Mr. McAlexander included as  
09:58:48 21 the Court's claim constructions -- or some of the Court's  
09:58:52 22 claim constructions in this case; do you recall that?

09:58:53 23 A. Yes, I do.

09:58:54 24 Q. And one of the terms is "adaptive beamforming"; do you  
09:58:57 25 see that?

09:58:58 1 A. Yes.

09:58:58 2 Q. Is this, the Court's definition of adaptive  
09:59:05 3 beamforming, is that consistent with your understanding of  
09:59:08 4 traditional adaptive beamforming in the field?

09:59:11 5 A. Yes, it's adaptively steering a directivity pattern,  
09:59:16 6 that's correct.

09:59:16 7 Q. And does Amazon use this traditional adaptive  
09:59:24 8 beamforming --

09:59:24 9 A. No.

09:59:24 10 Q. -- when the directivity pattern is steered?

09:59:27 11 A. No, we do not.

09:59:28 12 Q. And have you read the '049 patent?

09:59:37 13 A. Yes, I read it.

09:59:38 14 Q. When did you read it?

09:59:39 15 A. First time I read it was somewhere around April or May  
09:59:46 16 2019.

09:59:46 17 Q. Is that right after this lawsuit was filed?

09:59:48 18 A. I believe so, yes.

09:59:49 19 Q. And what was your reaction?

09:59:50 20 A. My reaction was that we did not practice any of the  
09:59:55 21 things in the patent.

09:59:56 22 Q. And why not?

09:59:58 23 A. Because we use fixed beamforming, and not adaptive  
10:00:04 24 beamforming, and we didn't do sound source localization or  
10:00:08 25 the noise reduction that was defined in compute delays, all

10:00:16 1 the things that we've been discussing here.

10:00:18 2 Q. And at some point has Amazon considered using this  
10:00:21 3 adaptive beamforming where the beam is steered in the  
10:00:25 4 direction of the sound source?

10:00:27 5 A. Oh, yeah, those ideas are all in the Brandstein book,  
10:00:30 6 as well as other sources, and we definitely considered  
10:00:33 7 using them. They're, you know, perfectly legitimate ideas.

10:00:38 8 Q. And have you tried things like that in the lab?

10:00:41 9 A. Yes, we have.

10:00:43 10 Q. Okay. But why did you not choose that approach when  
10:00:47 11 you built the Echo?

10:00:48 12 A. For various reasons. One of the -- we're talking about  
10:00:59 13 adaptive beamforming. I can go into the other things, too.  
10:01:04 14 But for adaptive beamforming, that requires basically --  
10:01:11 15 it's a more complex system than what we designed.

10:01:14 16 And you first have to, you know, find what  
10:01:15 17 direction you're going to point the beam, and then go and  
10:01:20 18 calculate all the coefficients to form a beam in that  
10:01:23 19 direction.

10:01:24 20 And so, first, that takes a lot of compute power.  
10:01:28 21 And our goal with the Echo is to make it a very inexpensive  
10:01:32 22 device because we don't want the cost of the device to be a  
10:01:37 23 hindrance for the people using Alexa. And so our goal was  
10:01:42 24 to not do something that was going to be compute heavy on  
10:01:45 25 the device.

10:01:49 1 And so we thought, you know, it will save us  
10:01:52 2 processing cost, even to do something simpler like fixed  
10:01:57 3 beamforming.

10:01:57 4 Q. Are there benefits in being able to quickly just hit  
10:02:04 5 the wake word and not having to locate the sound source  
10:02:07 6 before you form a beam?

10:02:08 7 A. Oh, yeah. That's certainly another one. As Mr. Prasad  
10:02:12 8 had testified earlier, we want to, you know, detect the  
10:02:15 9 wake word right away.

10:02:16 10 And, basically, if we were to do something like  
10:02:23 11 adaptive beamforming, that could easily spend a few hundred  
10:02:29 12 milliseconds or more in figuring out where to point the  
10:02:32 13 beam and calculating the beam coefficients.

10:02:35 14 And so if we did all that, then we might miss the  
10:02:41 15 first part of somebody saying "Alexa," and that would be  
10:02:44 16 pretty bad. So we don't want -- we were concerned about  
10:02:48 17 that, as well.

10:02:48 18 Q. And are there benefits to the way that the ASR process  
10:02:56 19 is performed in the cloud from using fixed beams rather  
10:02:58 20 than adaptive beams?

10:02:59 21 A. Yeah. Again, as Mr. Prasad testified, the ASR is  
10:03:05 22 trained on -- on basically all this audio that we've  
10:03:13 23 captured from the device itself. And so, you know, we --  
10:03:15 24 it's very funny, we -- when we first made the Echo, we had  
10:03:20 25 hardware, we had a bunch of software running on it, but

10:03:22 1 Alexa still didn't work.

10:03:26 2           So, you know, it kind of looked like we were ready  
10:03:29 3 to ship the product, but it was far from it. And that's  
10:03:32 4 because we had to take the device with the fixed beamformer  
10:03:36 5 coefficients on there and go all over the country to  
10:03:39 6 basically collect speech from, you know, all sorts of  
10:03:42 7 different people with all the different ways that they  
10:03:45 8 spoke and -- and capture that audio to train our speech  
10:03:49 9 recognition system so it could learn that.

10:03:51 10           And -- and so that's why we had to have all  
10:03:55 11 that -- all those beams fixed. We couldn't change them.

10:03:58 12           And if we did something like the -- like adaptive  
10:04:02 13 beamformer where we're changing the coefficients, then the  
10:04:07 14 ASR might not understand the speech because it's going to  
10:04:11 15 be changed in a way that it doesn't understand. And we  
10:04:16 16 didn't want to take that risk.

10:04:18 17           And so that's why we came up with a simpler  
10:04:20 18 approach of using fixed beams so that we would not have the  
10:04:24 19 risk of speech recognition system not understanding what  
10:04:28 20 was being said.

10:04:29 21 Q. So there is a -- you were concerned -- is it correct  
10:04:32 22 that you were concerned about the risk of losing all that  
10:04:35 23 learning and training if you changed the coefficients?

10:04:41 24 A. Yes. And, I mean, the thing with -- yeah, you lose  
10:04:44 25 that -- that training, and the thing with adaptive

10:04:48 1 beamforming is that there's infinite number of coefficient  
10:04:51 2 combinations. So there's no way to really learn what the  
10:04:55 3 adaptive beamforming is going to do.

10:04:59 4 Q. And we've seen some documents -- Amazon documents that  
10:05:01 5 have been put up on the screens that show a block labeled  
10:05:06 6 ABF.

10:05:08 7 A. Yes.

10:05:08 8 Q. What does that refer to?

10:05:09 9 A. Yeah. So that -- that does refer to what we internally  
10:05:15 10 call adaptive beamforming. And, if I can, I'd like to  
10:05:22 11 clear up that confusion.

10:05:23 12 Q. Sure.

10:05:24 13 MR. HADDEN: Can we pull up DTX-342, please,  
10:05:28 14 Mr. Berk?

10:05:29 15 Q. (By Mr. Hadden) So this is an example of one of those  
10:05:31 16 documents, I think.

10:05:32 17 What is this DTX-342, Mr. Hilmes?

10:05:34 18 A. This is a document talking about Octave, Audio Front  
10:05:42 19 End Software Architecture. Octave is the Echo studio.  
10:05:46 20 That's the bigger Echo device.

10:05:47 21 MR. HADDEN: Okay. Can we go to that reference,  
10:05:50 22 Mr. Berk, to ABF? It's right there, yeah.

10:05:59 23 Q. (By Mr. Hadden) Can you explain to the jury what --  
10:06:02 24 what this says?

10:06:05 25 A. Yeah, again, this is talking about our internal



10:06:12 1 adaptive beamformer to reduce the noise in the null beams,  
10:06:19 2 which are the beams pointed away from the beam that we  
10:06:22 3 selected, and it's telling the -- the software engineers,  
10:06:29 4 because this document is for the software engineers, to not  
10:06:32 5 confuse this with an actual adaptive beamformer. And --  
10:06:37 6 Q. And the -- sorry, go ahead.

10:06:39 7 A. No, that's it.

10:06:40 8 Q. And the reference here to actual ABF, is that the  
10:06:45 9 traditional beam steering adaptive beamforming?

10:06:50 10 A. Yeah. In industry this would never be referred to as  
10:06:54 11 adaptive beamforming. We just -- yeah, I can tell you why  
10:06:57 12 we chose that name.

10:06:58 13 Q. Okay. So why did you choose that name if it doesn't  
10:07:03 14 jibe with the industry?

10:07:05 15 A. So, in 2015, this is after we launched the first Echo,  
10:07:09 16 we were developing the Echo Show. We had on our roadmap to  
10:07:13 17 do adaptive beamforming. And you can -- you know, you have  
10:07:17 18 seen Dr. Chhetri's notebook here. He talks -- he does, you  
10:07:21 19 know, talk about adaptive beamforming, as well.

10:07:25 20           So we -- you know, we had it always on our mind  
10:07:26 21 that it was something that we wanted to do. But for the  
10:07:29 22 reasons I just told you, we had a lot of concerns about it,  
10:07:32 23 and we weren't sure if it would actually work.

10:07:35 24           So, in 2015, he went and created an implementation  
10:07:40 25 of it and tried it out. And what he found was that it

10:07:45 1 actually hurt the speech recognition. It made it worse.  
10:07:49 2 And so using adaptive beamforming was not good for the  
10:07:54 3 Echo. It wasn't right.

10:07:55 4 And so he -- he still wanted, though, to try and  
10:08:02 5 figure out something that could, you know, improve the --  
10:08:07 6 the speech and the audio more than what we were already  
10:08:09 7 doing.

10:08:10 8 So what he did was he used the fixed beamformer  
10:08:15 9 and took, like, one of the main beams that was selected,  
10:08:20 10 and then subtracted two of the opposite-facing beams from  
10:08:25 11 that beam.

10:08:26 12 And so it's just using the fixed beams to do that.  
10:08:31 13 And -- and -- and he called it adaptive beamforming because  
10:08:36 14 it was, you know, his attempt to just use fixed beams to do  
10:08:40 15 something like what was -- he originally was trying to do.  
10:08:46 16 So for better or for worse, the name stuck. So that's what  
10:08:50 17 we used.

10:08:51 18 But in no -- in no way is it like, you know, an  
10:08:55 19 actual adaptive beamforming. It's like, you know, you put  
10:08:57 20 a -- you know, something like fins on a car and maybe you  
10:09:01 21 want to put wings on a car to make a flying car but decide  
10:09:06 22 to cut them back to just fins, but you still call them  
10:09:10 23 wings. But that car is never going to fly. It's not an  
10:09:14 24 airplane. So it's kind of like that.

10:09:15 25 Q. Sir, this ABF that's referred to in the Amazon

10:09:18 1 documents, does that change any of the coefficients that  
10:09:21 2 fix the beam directions?

10:09:23 3 A. No, no, the -- the beam coefficients, again, still  
10:09:27 4 remain the same. We're not changing the beams at all.

10:09:30 5 Q. Thank you, Mr. Hilmes.

10:09:38 6 Do Echos use sound source localization?

10:09:41 7 A. No, they do not.

10:09:43 8 Q. Why not?

10:09:44 9 A. Again, this is a very complex process to do sound  
10:09:51 10 source localization. Again, it was something that we  
10:09:53 11 thought about doing. It's -- it's a neat process to try  
10:09:59 12 and map out where sound is coming from, but it's very  
10:10:06 13 expensive. And, again, it's something that takes a lot of  
10:10:09 14 compute to do.

10:10:10 15 So, again, to minimize the cost of the processor  
10:10:14 16 so that we can use these general purpose processors in our  
10:10:18 17 devices, we did not use sound source localization, and not  
10:10:24 18 only because it's expensive, but just because we don't have  
10:10:27 19 any need for it since we're using fixed beams.

10:10:31 20 Q. And when processing the audio from the microphones, do  
10:10:35 21 Echos determine a delay between each microphone in an  
10:10:42 22 origin of the array?

10:10:43 23 A. No, we don't do that.

10:10:44 24 Q. Why not?

10:10:45 25 A. There's no need for it. We -- we have our fixed beams,

10:10:52 1 and they're fixed in their directions, but we have no need  
10:10:56 2 to calculate any delay on the product.

10:10:58 3 Q. Okay. And you were here for Mr. McAlexander's  
10:10:59 4 testimony yesterday?

10:10:59 5 A. Yes, I was.

10:11:00 6 Q. And when Mr. McAlexander said that the SDB fixed  
10:11:08 7 beamformer code calculated delays or determined delays, was  
10:11:12 8 that correct?

10:11:12 9 A. No, it was not correct.

10:11:14 10 Q. And does the Echo use an angle to the target sound  
10:11:24 11 source at all?

10:11:25 12 A. No, we don't care where the sound is coming from.

10:11:33 13 MR. HADDEN: Let me -- can we see Plaintiff's 301?

10:11:36 14 Q. (By Mr. Hadden) Do you recognize this paper,  
10:11:43 15 Mr. Hilmes?

10:11:43 16 A. Yes, I do.

10:11:44 17 Q. And you were one of the co-authors; is that right?

10:11:47 18 A. That's correct.

10:11:48 19 Q. Okay. Were you the primary drafter of this?

10:11:52 20 A. Excuse me?

10:11:52 21 Q. Were you the primary writer?

10:11:54 22 A. No, I was not. That would be Amit Chhetri --  
10:11:58 23 Dr. Chhetri.

10:11:58 24 Q. Dr. Chhetri. And what is this paper generally about?

10:12:02 25 A. This paper is about various audio front end algorithms

10:12:08 1 that can be used for far-field speech recognition.

10:12:12 2 Q. Okay. And does this paper describe exactly how an Echo  
10:12:17 3 works?

10:12:18 4 A. No, it does not.

10:12:22 5 Q. And so why did you write a paper about audio front end  
10:12:27 6 or far-field automatic speech recognition and not provide  
10:12:31 7 the specific details about how the Echo operates?

10:12:34 8 A. Well, we want to basically share with the scientific  
10:12:39 9 community some of our work and some of our research into  
10:12:43 10 various, you know, front end processing that we've  
10:12:48 11 investigated. And -- and, in general, we're not allowed to  
10:12:53 12 disclose exactly what we do on the device.

10:12:57 13 Q. And this paper is from 2018. By 2018, were there  
10:13:01 14 competing devices?

10:13:02 15 A. Oh, yes. There were many devices at this point, not  
10:13:06 16 just Echo devices, but those from competing companies like  
10:13:11 17 Google and Apple, and then, of course, all the third  
10:13:15 18 parties that we work with, as well, dozens of solution  
10:13:22 19 providers.

10:13:22 20 Q. And does this paper describe ideas that Amazon had  
10:13:26 21 thought about but not implemented?

10:13:28 22 A. Yes, it does.

10:13:29 23 Q. I saw a reference in this paper to using deep neural  
10:13:34 24 nets to do beamforming. Is that something that Amazon had  
10:13:39 25 actually implemented?

10:13:40 1 A. We researched it and prototyped it, but we did not  
10:13:44 2 implement it in any product.

10:13:46 3 Q. Okay. And if someone wanted to understand exactly how  
10:13:51 4 the Echo processes audio, what would be the best source for  
10:13:55 5 that?

10:13:56 6 A. They would have to look at the source code.

10:13:58 7 Q. And does Amazon protect its source code? Does it guard  
10:14:04 8 it from disclosure?

10:14:06 9 A. Yes, it does.

10:14:07 10 Q. Why does Amazon do that?

10:14:09 11 A. For multiple reasons. One, because that's our  
10:14:13 12 intellectual property, and we want to make sure that -- you  
10:14:18 13 know, we have a lot of competition, and we want to, you  
10:14:22 14 know, make sure the competition doesn't get it.

10:14:24 15 We're-- we're also, of course, very worried about  
10:14:27 16 people hacking our devices and trying to get into them and  
10:14:30 17 sharing that source code. You know, it might give them an  
10:14:38 18 edge on how to do that. So we definitely took many steps  
10:14:42 19 to protect that source code.

10:14:43 20 Q. And you mentioned earlier a product called the Amazon  
10:14:46 21 Tap. Do you recall that?

10:14:47 22 A. Yes, I do.

10:14:48 23 Q. What is an Amazon Tap?

10:14:50 24 A. Amazon Tap is very much like another Echo, except it --  
10:14:59 25 two things, it's -- it's portable, it has a battery in it,

10:15:02 1 and it only has one microphone.

10:15:03 2 Q. Okay. And does the Amazon Tap perform far-field speech  
10:15:07 3 recognition?

10:15:07 4 A. Yes, it does.

10:15:08 5 Q. And does the Amazon Tap send audio to the Cloud that is  
10:15:16 6 interpreted by that ASR technology that Dr. -- or  
10:15:21 7 Mr. Prasad testified about?

10:15:22 8 A. Yes, it works exactly the same.

10:15:25 9 MR. HADDEN: Can you take this down, please,  
10:15:27 10 Mr. Berk?

10:15:29 11 Q. (By Mr. Hadden) Now, we saw the interview notes  
10:15:31 12 earlier from Mr. Prasad, and Vocalife's counsel showed  
10:15:40 13 Mr. Prasad that you had also interviewed Dr. Li; is that  
10:15:43 14 correct?

10:15:43 15 A. Yes, that's correct.

10:15:44 16 Q. Okay.

10:15:47 17 MR. HADDEN: And can we pull up, please,  
10:15:54 18 DTX-491.2, please, Mr. Berk?

10:15:59 19 Q. (By Mr. Hadden) Are these your interview notes from  
10:16:02 20 interviewing Dr. Li back in 2013, Mr. Hilmes?

10:16:06 21 A. Yes, that's correct.

10:16:08 22 Q. Okay. And do you recall that interview?

10:16:13 23 A. I had to refresh myself with the notes, but, yes, after  
10:16:17 24 I did, I -- I could recall it.

10:16:18 25 Q. Okay.

10:16:19 1 MR. HADDEN: Could we blow up the first two  
10:16:22 2 sentences of the second paragraph, please, Mr. Berk?

10:16:33 3 Q. (By Mr. Hadden) And you write here: I spent most of  
10:16:37 4 my time asking him technical questions about beamforming  
10:16:40 5 and AEC. He did not do very well with several of those  
10:16:45 6 questions.

10:16:45 7 Do you see that?

10:16:46 8 A. Yes, I do.

10:16:47 9 Q. Can you explain -- can you recall what the issues were  
10:16:51 10 with Dr. Li's ability to answer your questions?

10:16:53 11 A. I don't recall my exact questions I used with Dr. Li,  
10:16:59 12 but, yeah, we were looking for somebody who knew about, you  
10:17:03 13 know, the technologies that we had in the Amazon Echo, like  
10:17:08 14 the beamforming and echo canceler.

10:17:12 15 And so I -- I believe I asked him fairly  
10:17:15 16 fundamental and basic questions about how those types of  
10:17:18 17 algorithms work. And he didn't give me very accurate or  
10:17:24 18 correct answers.

10:17:26 19 Q. And, in your interview, did Dr. Li tell you that he had  
10:17:32 20 presented audio-processing technology to Amazon?

10:17:35 21 A. No, he did not.

10:17:37 22 Q. Okay. Did Dr. Li mention anything about patents he had  
10:17:41 23 on audio-processing technology in that interview?

10:17:44 24 A. I don't believe so. I mean, it's possible he mentioned  
10:17:48 25 patents. Most everybody we interview has patents, but he



10:17:53 1 certainly didn't mention anything about having something  
10:17:57 2 specific to what we were working on.

10:17:59 3 Q. Okay. And if Dr. Li had mentioned that he had specific  
10:18:04 4 patents related to what you were working on, what would you  
10:18:07 5 have done?

10:18:07 6 A. I would have contacted one of our patent attorneys to  
10:18:15 7 ask him to look into it further.

10:18:19 8 Q. And have you heard -- have you heard anything else from  
10:18:25 9 Dr. Li after this 2013 interview?

10:18:26 10 A. No, I don't believe I did.

10:18:31 11 MR. HADDEN: We can take this down, please,  
10:18:33 12 Mr. Berk.

10:18:33 13 Could we pull up Plaintiff's 1377, please,  
10:18:42 14 Mr. Berk?

10:18:45 15 Q. (By Mr. Hadden) Do you recognize PTX-1377 that we have  
10:18:52 16 on the screen, Mr. Hilmes?

10:18:53 17 A. I've seen it in this trial, yes.

10:18:56 18 Q. Okay. And what is the -- what is this presentation  
10:19:03 19 about?

10:19:03 20 A. This is about how to integrate Alexa voice technology  
10:19:11 21 into a third-party product. The Alexa Voice Services team,  
10:19:16 22 which is a separate organization from mine, focuses on  
10:19:20 23 helping third-party companies integrate Alexa.

10:19:27 24 MR. HADDEN: So can we go to Slide 62 in this  
10:19:29 25 presentation, please, Mr. Berk?

10:19:32 1 Q. (By Mr. Hadden) So this is a slide that we saw several  
10:19:35 2 times with Mr. McAlexander. Do you recognize this slide?

10:19:38 3 A. Yes, I do.

10:19:38 4 Q. Now, is this slide describing anything about how the  
10:19:43 5 Echo works?

10:19:45 6 A. No.

10:19:46 7 Q. And is there -- this -- this program for supporting  
10:19:56 8 third-party companies to integrate with Alexa, is part of  
10:20:02 9 that program that Amazon provide the specific audio  
10:20:07 10 processing algorithms that you use in the Echo?

10:20:12 11 A. No, we don't. Alexa Voice Services works with lots of  
10:20:15 12 third-party solution providers, so there's a lot of other  
10:20:17 13 companies out there that make audio front end processing  
10:20:22 14 software that, you know, do all sorts of things, some of  
10:20:27 15 which we do, some of which we don't do, and then they match  
10:20:31 16 those up to companies that actually build devices.

10:20:34 17 So those companies building devices can license  
10:20:39 18 them. And -- and, yeah, that's where they get their  
10:20:42 19 technology from.

10:20:42 20 Q. And to the -- to the extent this kind of cartoony  
10:20:48 21 diagram suggests that you would locate a speaker by looking  
10:20:51 22 at the first and last arrival times of the microphone, is  
10:20:54 23 that something that the Echo does?

10:20:56 24 A. No, we do not do that in the Echo.

10:21:00 25 MR. HADDEN: Pass the witness.

10:21:02 1 THE COURT: All right. Ladies and gentlemen,  
10:21:05 2 before we proceed with the Plaintiff's cross-examination of  
10:21:07 3 this witness, we're going to take a short recess.

10:21:09 4 You may simply close and leave your notebooks in  
10:21:12 5 your chairs. Follow all the instructions I've given you  
10:21:14 6 about your conduct during the trial, including --  
10:21:19 7 including, of course, not to discuss the case among each  
10:21:21 8 other. We'll be back shortly to continue with  
10:21:24 9 cross-examination.

10:21:24 10 The jury is excused for recess at this time.

10:21:26 11 COURT SECURITY OFFICER: All rise.

10:21:27 12 (Jury out.)

10:21:27 13 THE COURT: The Court stands in recess.

10:21:56 14 (Recess.)

10:43:11 15 (Jury out.)

10:43:11 16 COURT SECURITY OFFICER: All rise.

10:43:12 17 THE COURT: Be seated, please.

10:43:19 18 Mr. Fabricant, are you going to cross-examine this  
10:43:22 19 witness?

10:43:23 20 MR. FABRICANT: Yes, Your Honor.

10:43:24 21 THE COURT: You may go to the podium and prepare.

10:43:26 22 MR. FABRICANT: Thank you.

10:43:27 23 THE COURT: Are there binders to pass out here?

10:43:29 24 MR. FABRICANT: Yes, Your Honor.

10:43:30 25 THE COURT: Let's do that.

10:43:54 1 All right. Mr. Johnston, let's bring in the jury,  
10:43:59 2 please.

10:43:59 3 COURT SECURITY OFFICER: All rise.

10:44:00 4 (Jury in.)

10:44:11 5 THE COURT: Please be seated.

10:44:24 6 All right. The Defendant having passed the  
10:44:30 7 witness, we'll proceed with cross-examination by the  
10:44:32 8 Plaintiff.

10:44:33 9 Mr. Fabricant, you may proceed.

10:44:37 10 MR. FABRICANT: Thank you, Your Honor.

10:44:37 11 CROSS-EXAMINATION

10:44:38 12 BY MR. FABRICANT:

10:44:38 13 Q. Good morning, Mr. Hilmes.

10:44:39 14 A. Good morning, sir.

10:44:43 15 MR. FABRICANT: Could we have the ELMO, please?

10:44:45 16 Q. (By Mr. Fabricant) Mr. Hilmes, could you describe for  
10:45:01 17 the jury the various components which are shown in -- in  
10:45:05 18 this image?

10:45:06 19 A. Yes. The -- this is the original Amazon Echo, and the  
10:45:13 20 top piece is a piece of plastic. It's a cover for the  
10:45:17 21 components that are in -- inside. It's got two buttons on  
10:45:22 22 top, holes for the microphones, and a piece of  
10:45:30 23 semi-transparent plastic for the light ring.

10:45:32 24 The board below that is PCB board, as we call it,  
10:45:39 25 and it's got a lot of the components on there, such as the

10:45:42 1 microphones, as I was describing earlier; also the -- the  
10:45:45 2 LED lights for the light ring; and a few other parts, as  
10:45:52 3 well. And then there's a couple other plastic pieces, a  
10:45:58 4 gear for turning the -- changing the volume on there, and  
10:46:01 5 so on.

10:46:03 6 Q. Now, you're a leader in the group that is the audio  
10:46:07 7 front end of the Echo devices, isn't that true?

10:46:10 8 A. Yes, that's correct.

10:46:12 9 Q. And is this a fair characterization depicted in this  
10:46:16 10 image of the audio front end components?

10:46:20 11 A. No, these are the hardware components.

10:46:23 12 Q. These are the hardware components, correct?

10:46:25 13 A. Correct.

10:46:25 14 Q. Now, if I remove the PCB board with the microphone  
10:46:29 15 array, does the Echo work?

10:46:31 16 A. No, it has to have at least one microphone to work.

10:46:34 17 Q. And this is a circular array of seven microphones,  
10:46:38 18 correct?

10:46:38 19 A. That's correct.

10:46:39 20 Q. And if we take this out of the device, if -- if Amazon  
10:46:42 21 never had a circular array of seven microphones to put at  
10:46:47 22 the top of this device, all of that Alexa stuff we heard  
10:46:50 23 about this morning, with the brain and the Cloud, none of  
10:46:55 24 that would -- would work, would it?

10:46:57 25 A. That will work. It just wouldn't work through this

10:47:03 1 particular device.

10:47:05 2 Q. What --

10:47:06 3 A. Sorry.

10:47:07 4 Q. You certainly wouldn't be able to have a customer  
10:47:10 5 access the brain of Alexa through a voice-activated device  
10:47:14 6 unless you had a microphone array which allowed for speech  
10:47:18 7 detection and communication, correct?

10:47:21 8 A. For that device, yes. We also had a remote control  
10:47:27 9 that had a microphone in it that you could use with it --  
10:47:30 10 with the Alexa service, as well as the software app on the  
10:47:33 11 phone.

10:47:34 12 MR. FABRICANT: Move to strike the last portion of  
10:47:36 13 the answer as non-responsive.

10:47:39 14 THE COURT: Sustained.

10:47:40 15 Mr. Hilmes, you need to limit your answers to the  
10:47:45 16 questions asked, please.

10:47:46 17 THE WITNESS: Yes, Your Honor.

10:47:47 18 THE COURT: In the last instance, you said: For  
10:47:47 19 that device, yes.

10:47:47 20 That was a perfectly completed answer. The rest  
10:47:51 21 of it was not called for, and I'm striking that from your  
10:47:52 22 answer.

10:47:52 23 Let's proceed.

10:47:53 24 Q. (By Mr. Fabricant) Now, you arrived I believe at  
10:47:55 25 Amazon in December of 2012, correct?

10:47:58 1 A. Yes, that's correct.

10:47:59 2 Q. And at the time you arrived, Amazon was already in the  
10:48:02 3 process of developing hardware and software for what was to  
10:48:06 4 become an Echo device; is that -- is that true?

10:48:09 5 A. Yes, sir.

10:48:10 6 Q. And I believe you testified this morning that there  
10:48:13 7 were about 10 people in the group that were working on the  
10:48:17 8 development of the Echo device when you arrived; is that  
10:48:20 9 right?

10:48:20 10 A. There were 10 people on my team, but there were many  
10:48:23 11 more beyond that.

10:48:24 12 Q. Well, what was your team exactly?

10:48:26 13 A. My team was the audio technology team developing the  
10:48:33 14 algorithms and software for doing the audio processing on a  
10:48:37 15 device.

10:48:37 16 Q. And, in fact, when you first got to Amazon, you were  
10:48:39 17 also in another group, were you not, not just the Group D  
10:48:43 18 Doppler, but another group; is that correct?

10:48:46 19 A. Yes, that's correct.

10:48:46 20 Q. And what was the other group?

10:48:47 21 A. The other group was called Project C Shimmer and  
10:48:52 22 Project D Doppler was actually a spin-out of that other  
10:48:57 23 project Shimmer.

10:48:58 24 Q. And there was a time when you were working on both  
10:49:01 25 Project C and Project D, correct?

10:49:01 1 A. From the very beginning, yes.

10:49:03 2 Q. So you were intermingled between Project C and  
10:49:08 3 Project D with respect to the engineering work that you  
10:49:10 4 were doing from the time you got there, right?

10:49:11 5 A. Yes, because Project D was a spin-out.

10:49:14 6 Q. And C -- Project C was a failure, that was some kind of  
10:49:17 7 a holographic image device that never was launched; is that  
10:49:21 8 true?

10:49:21 9 A. I would not call it a failure, and it was not doing  
10:49:23 10 holographic imaging.

10:49:25 11 Q. What was it doing?

10:49:26 12 A. It was basically a -- did everything that the Echo did  
10:49:31 13 with speech recognition, and had microphone array on it and  
10:49:37 14 could hear your voice and understand it. But it could  
10:49:40 15 also -- it also had a projector on there so it could  
10:49:44 16 project an image on a wall, on a desktop, and even your  
10:49:48 17 hand, and then you could use your other hand to interact  
10:49:51 18 with it, and -- and it could see what your other hand was  
10:49:53 19 doing. So you could interact with it with, you know, your  
10:49:57 20 hands or with your voice.

10:49:58 21 Q. Now, we heard testimony at this trial from some Amazon  
10:50:02 22 employees that there was very strong security as far as  
10:50:05 23 locking floors and rooms so that one group could not  
10:50:10 24 intermingle with another engineering group. Do you recall  
10:50:13 25 that testimony?



10:50:14 1 A. Yes, I do.

10:50:15 2 Q. Did that apply to you when you arrived? Were you set  
10:50:19 3 up in a way that you couldn't move from Group C to Group D  
10:50:22 4 because of locked floors or rooms?

10:50:25 5 A. It did not apply to Groups C and D. It applied to  
10:50:28 6 other -- other projects.

10:50:29 7 Q. It was your understanding it did apply to B and D,  
10:50:33 8 though, correct?

10:50:33 9 A. That's correct.

10:50:34 10 Q. And B was Fire Phone, right?

10:50:36 11 A. Yes.

10:50:36 12 Q. And those Fire Phone people should have never ever  
10:50:41 13 intermingled with Doppler in meeting with Dr. Li when he  
10:50:44 14 had his meeting at Amazon on October 17, 2011, should they  
10:50:49 15 have?

10:50:50 16 A. I don't know that. As a general rule, that wasn't  
10:50:55 17 allowed, but there could have been some exception made.

10:50:58 18 Q. I'm asking you about what you do know. You know from  
10:51:02 19 your own experience and from what you were told as  
10:51:06 20 corporate policy that the people from B should have never  
10:51:08 21 met with the engineers from D to discuss under NDA an  
10:51:12 22 engineering project. You agree with that, don't you?

10:51:16 23 A. I'm sorry, can you state the question one more time?

10:51:20 24 Q. Yes, certainly -- certainly, sir.

10:51:21 25 We know that people from C met with -- I'm sorry,

10:51:25 1 strike that.

10:51:25 2 We know that people from B, Fire Phone, met with  
10:51:30 3 people from D, Doppler/Echo. As you understood the  
10:51:35 4 corporate policy, that should not have happened, correct?

10:51:38 5 A. I don't know that people from Project B met with  
10:51:41 6 Project D.

10:51:42 7 Q. Let's assume they did for the moment, because the  
10:51:44 8 testimony in this court from Amazon employee Wei Li was  
10:51:49 9 that he was from D and other people, like Aleksandar Pance,  
10:51:56 10 was from B. You heard that testimony, correct?

10:51:59 11 A. I did hear the testimony.

10:52:00 12 Q. So that's someone from B and someone from D, right?

10:52:03 13 A. Yes.

10:52:07 14 Q. And they never should have met together to discuss  
10:52:09 15 Dr. Li's project; isn't that your understanding?

10:52:13 16 A. No, I don't know that.

10:52:14 17 Q. You don't know that they met, or you don't know that  
10:52:16 18 they shouldn't have met?

10:52:18 19 A. I don't know either of those.

10:52:23 20 Q. You just don't know?

10:52:25 21 A. Right. I don't know.

10:52:25 22 Q. You were shown this morning a big -- I think you called  
10:52:31 23 it a lab notebook?

10:52:32 24 A. Yes, that's correct.

10:52:33 25 Q. DTX-27.

10:52:35 1 MR. FABRICANT: Can we bring that up, please?

10:52:37 2 A. This one?

10:52:41 3 Q. (By Mr. Fabricant) Yes. I'm glad you have it right in  
10:52:44 4 front of you.

10:52:45 5 Whose notebook was that?

10:52:47 6 A. It's Dr. Chhetri's, who reports to me.

10:52:51 7 Q. He reports to you now, and I believe you said he  
10:52:54 8 reported to you from the time you arrived at Amazon; is  
10:52:58 9 that right?

10:52:58 10 A. That's correct.

10:52:58 11 Q. Do you keep your own notebook, sir?

10:53:01 12 A. I kept notes on my computer. I didn't -- I was not one  
10:53:05 13 who kept handwritten notes.

10:53:07 14 Q. Well, you were an engineer working on the development  
10:53:09 15 of Echo beginning in late 2012. Where's your notebook,  
10:53:14 16 sir?

10:53:14 17 A. My notebook -- or my notes are on my PC or computer.

10:53:17 18 Q. Have you brought them with you today to this courtroom  
10:53:20 19 to show the jury?

10:53:20 20 A. No, I have not.

10:53:21 21 Q. But you have brought your -- is it Mr. Chhetri or  
10:53:29 22 Doctor?

10:53:29 23 A. Dr. Chhetri.

10:53:31 24 Q. You have brought his notebook, right?

10:53:33 25 A. Yes, I have.

10:53:34 1 Q. And you've only -- only brought it for a very limited  
10:53:37 2 period of time; isn't that right? I think it starts, as  
10:53:42 3 counsel pointed out, in February of 2011, and I think the  
10:53:45 4 last day of the notebook is June 7th of 2011. Do you agree  
10:53:48 5 with that?

10:53:49 6 A. Yes, I do.

10:53:49 7 Q. Where's the rest of his notebook?

10:53:55 8 A. I don't have the notebook.

10:53:56 9 Q. Well, wouldn't it be helpful for the jury to be able to  
10:53:59 10 see all of the entries that followed June 7 of '11, a very  
10:54:07 11 critical time in the development of Echo? Don't you agree  
10:54:10 12 that would be helpful?

10:54:10 13 A. I don't know.

10:54:10 14 Q. You didn't bring it with you today, though?

10:54:10 15 A. I did not bring it today.

10:54:10 16 Q. And you're not able to testify about what's in the  
10:54:12 17 remaining pages of that notebook, are you, sir?

10:54:14 18 A. No, I'm not.

10:54:15 19 Q. And that's a very short period of time in the  
10:54:18 20 development of Echo, isn't it? Just a few months out of  
10:54:22 21 the years of development? You'll agree with that, right?

10:54:24 22 A. Yeah, that's true. It's just a few months.

10:54:28 23 MR. FABRICANT: Let's look at DTX-27.12.

10:54:37 24 Q. (By Mr. Fabricant) Do you remember you were shown by  
10:54:40 25 Mr. Hadden this particular page?

10:54:41 1 A. Yes.

10:54:42 2 Q. And you saw the little array. I'm not sure if it's an  
10:54:45 3 octagon or what it is. But we can see what it is there.

10:54:49 4 Do you see that?

10:54:50 5 A. Yes.

10:54:50 6 Q. And do you see the words right under that little  
10:54:53 7 figure, "some theoretical stuff on arrays"?

10:54:58 8 Do you see that?

10:54:59 9 A. Yes, I do.

10:54:59 10 Q. Theoretical means maybe you can do it, maybe you can't;  
10:55:03 11 it's theoretical; nobody's ever done it before. Isn't that  
10:55:05 12 what that means?

10:55:06 13 A. Yeah, it's their -- it doesn't mean that nobody's ever  
10:55:11 14 done it, but maybe to Dr. Chhetri's knowledge it was  
10:55:15 15 theoretical, yes.

10:55:15 16 Q. Well, you're a scientist, correct? You're an engineer?

10:55:19 17 A. Yes.

10:55:19 18 Q. If something -- if something is theoretical, it means  
10:55:23 19 it has never been proven; isn't that true?

10:55:24 20 A. I think to that person, yes.

10:55:26 21 Q. Yes. So here we are in 2011 in Mr. Chhetri's  
10:55:33 22 notebook -- we don't have the rest of it -- and he's saying  
10:55:36 23 this is theoretical stuff, theoretical stuff. You agree  
10:55:39 24 with that, correct?

10:55:40 25 A. Yes, that's right.

10:55:47 1 MR. FABRICANT: And let's go to Page 27.199.

10:55:53 2 Q. (By Mr. Fabricant) There's a -- a section at the whole  
10:56:09 3 bottom half of the page called Tasks Remaining in Adaptive  
10:56:13 4 B/F Algorithm.

10:56:15 5 Do you see that?

10:56:16 6 A. Yes, I do.

10:56:17 7 Q. And then the words R&D?

10:56:19 8 A. Yes, I do.

10:56:20 9 Q. R&D typically means research and development; is that  
10:56:24 10 correct?

10:56:24 11 A. That's correct, sir.

10:56:25 12 Q. And so here we're talking about tasks remaining in  
10:56:30 13 adaptive beamforming algorithm.

10:56:32 14 Now, is this a real adaptive beamforming  
10:56:35 15 algorithm, or is this the -- the fake one that you referred  
10:56:39 16 to earlier today where you just use the word, but it  
10:56:40 17 doesn't really mean adaptive beamforming? Which one is  
10:56:43 18 this one?

10:56:43 19 A. Well -- so I would not use the words "real" or "fake,"  
10:56:47 20 but based on reading this text, this appears to be what is  
10:56:58 21 traditionally termed an adaptive beamformer, yes.

10:57:03 22 Q. You mean the true type of adaptive beamforming?

10:57:05 23 A. Yes.

10:57:06 24 Q. The one that you say is not embodied in the Echo device  
10:57:09 25 today, correct?

10:57:10 1 A. That's correct.

10:57:11 2 Q. But we know that Mr. Chhetri apparently in his notebook  
10:57:15 3 during this period of time, we could go through all four or  
10:57:20 4 five months of this, he was working on trying to come up  
10:57:23 5 with adaptive beamforming, correct?

10:57:24 6 A. Yes, as I stated in my previous testimony, he was  
10:57:27 7 researching this area.

10:57:29 8 Q. And then right below -- just a few lines below the  
10:57:33 9 sentenced that we discussed, do you see the words "need  
10:57:38 10 ideas"?

10:57:41 11 MR. FABRICANT: Can you highlight that, please,  
10:57:43 12 "need ideas"?

10:57:43 13 Q. (By Mr. Fabricant) Do you see that?

10:57:44 14 A. Yes.

10:57:44 15 Q. So it looks like Mr. Chhetri -- Dr. Chhetri needed some  
10:57:48 16 ideas in the formulation of adaptive beamforming. You'd  
10:57:51 17 agree with that, wouldn't you?

10:57:53 18 A. He needs ideas to avoid a problem that he was talking  
10:57:59 19 about with incoherent noise.

10:58:01 20 MR. FABRICANT: Let's bring up Plaintiff's  
10:58:03 21 Exhibit 36, please.

10:58:04 22 Q. (By Mr. Fabricant) Now, this is an exhibit from Jerry  
10:58:08 23 Wu, who first invited Dr. Li to come to Lab126 at Amazon.  
10:58:13 24 And this is dated September 20, 2011, a few months after  
10:58:21 25 Mr. Chhetri --

10:58:22 1 THE COURT: Mr. Fabricant, is there a question in  
10:58:24 2 this?

10:58:25 3 MR. FABRICANT: Yes. Yes, Your Honor.

10:58:27 4 THE COURT: Let's don't make a statement about  
10:58:29 5 what it is. Let's ask the witness a question about it.

10:58:33 6 MR. FABRICANT: Yes, Your Honor.

10:58:34 7 Q. (By Mr. Fabricant) Mr. Hilmes, you agree that the date  
10:58:39 8 of this appears to be September 20, 2011?

10:58:42 9 A. Yes, sir.

10:58:42 10 Q. And this is several months -- just a few months after  
10:58:45 11 the notebook entries that we just went through, correct?

10:58:46 12 A. That's correct.

10:58:47 13 Q. And Mr. Wu is inviting Dr. Li and his company to come  
10:58:51 14 in and do a presentation. Is that how you read this?

10:58:54 15 A. Yes, that's correct.

10:58:56 16 Q. And he wants him specifically to present adaptive  
10:58:58 17 beamforming, does he not?

10:58:59 18 A. Yes, that appears to be correct.

10:59:02 19 Q. And he also wants him to present noise echo  
10:59:07 20 cancellation and other things, correct?

10:59:08 21 A. Correct.

10:59:08 22 Q. Now, when this was all happening in 2011, you were not  
10:59:13 23 at Amazon, correct?

10:59:14 24 A. That's correct.

10:59:16 25 Q. And will you agree with me that you know absolutely



10:59:21 1 positively nothing about the meeting that took place, the  
10:59:24 2 demonstration at Amazon with Dr. Li and his company in  
10:59:28 3 October of 2011?

10:59:30 4 A. That's correct. I -- I only know what I've learned in  
10:59:33 5 this trial here.

10:59:35 6 Q. You of your own personal knowledge don't know who  
10:59:47 7 attended that meeting; is that true?

10:59:49 8 A. That's correct.

10:59:49 9 Q. And you don't know exactly what presentation or  
10:59:51 10 demonstrations were made by Dr. Li?

10:59:53 11 A. That's correct.

10:59:53 12 Q. You don't know the discussions he had with the Amazon  
10:59:56 13 engineers, correct?

10:59:57 14 A. Yes.

10:59:58 15 Q. And Mr. Wei Li said there may have been as many as  
11:00:00 16 seven or eight people in that meeting. You don't know what  
11:00:04 17 was said, do you?

11:00:04 18 A. No, I don't.

11:00:05 19 Q. And you don't know whether when that meeting ended, the  
11:00:09 20 engineers at Amazon, one or more of them, got together and  
11:00:11 21 said, we really like what Dr. Li has presented; let's use  
11:00:15 22 it. You don't know that, do you?

11:00:16 23 A. No.

11:00:17 24 Q. But you do know that after the meeting was over, the  
11:00:19 25 Amazon engineers asked for the detailed presentation,

11:00:21 1 because you've heard that testimony, correct?

11:00:23 2 A. Yes, that's standard procedure.

11:00:24 3 Q. Standard procedure to ask for a detailed technical  
11:00:29 4 presentation for a project that you're not interested in;  
11:00:31 5 is that your testimony?

11:00:32 6 A. No, that's not what I was saying.

11:00:43 7 Q. All right. Well, let's assume that they were not  
11:00:46 8 interested, that they were not impressed. Based upon your  
11:00:53 9 experience with many of these other meetings, if you -- if  
11:00:56 10 you could assume for the moment that they were not  
11:00:59 11 impressed, that they didn't like his technology, would they  
11:01:02 12 in the normal course of business ask him to send all of the  
11:01:07 13 detailed presentation?

11:01:08 14 A. If everyone there was not interested, then, no, they  
11:01:12 15 wouldn't have asked for that.

11:01:14 16 Q. Now, can you name -- who is your boss at Amazon today?  
11:01:17 17 Who do you report to?

11:01:18 18 A. I report to Dr. Pance.

11:01:21 19 Q. Dr. Pance?

11:01:23 20 A. Yes.

11:01:23 21 Q. Is that Aleksandar Pance?

11:01:26 22 A. Yes, that's correct.

11:01:27 23 Q. Also known as Aleksandar Sasha Pance?

11:01:31 24 A. I've never heard him referred to as Sasha.

11:01:33 25 Q. And he's your boss?

11:01:36 1 A. Yes, that's correct.

11:01:36 2 Q. When did he become your boss?

11:01:38 3 A. It was late 2014, right -- right around the time the

11:01:41 4 Fire Phone failed and Echo launched.

11:01:43 5 Q. Now, you heard the testimony at this trial that

11:01:53 6 Aleksandar Pance, prior to coming to Amazon, was an

11:01:55 7 engineer at Apple, correct?

11:01:55 8 A. He did work at Apple, yes.

11:01:58 9 Q. Well, you did hear the testimony that Dr. Li and his

11:02:05 10 company, including Dr. Zhu, went to Apple to give a

11:02:06 11 demonstration and a presentation, and they gave that

11:02:08 12 presentation to Aleksandar Pance; you heard that, did you

11:02:11 13 not?

11:02:11 14 A. Yes, I heard that.

11:02:12 15 Q. And no one disputes that testimony, do they?

11:02:13 16 A. Not that I've heard.

11:02:15 17 Q. And then within a short period of time, Aleksandar

11:02:21 18 Pance leaves Apple, having seen the presentation, and he

11:02:24 19 comes to Amazon and he's working at Lab20 -- Lab126; is

11:02:30 20 that right?

11:02:30 21 A. That's correct.

11:02:31 22 Q. And now he's at Lab126, and what happens? The

11:02:34 23 engineers of 126 invite Dr. Li to come in to give the

11:02:37 24 presentation to Amazon. Does that sound accurate?

11:02:40 25 A. Yes.

11:02:46 1 Q. And now this Aleksandar Pance is your boss. He's the  
11:02:50 2 head of the whole group, correct?

11:02:52 3 A. Yes.

11:02:53 4 Q. Is Aleksandar Pance, did he come here to testify at  
11:02:57 5 this trial?

11:02:57 6 A. No. He provided the video deposition.

11:02:59 7 Q. Does he dispute that he was at this meeting?

11:03:03 8 A. I believe he did not recall.

11:03:04 9 Q. Doesn't recall whether he went to the meeting?

11:03:06 10 A. Correct.

11:03:07 11 Q. And Mr. Rohit Prasad doesn't recall whether he ever got  
11:03:13 12 the letter that Dr. Li wrote complaining about what he saw  
11:03:17 13 at the demonstration, right?

11:03:18 14 A. That was his testimony.

11:03:23 15 Q. Now, when you got to Amazon in December of 2012, you  
11:03:32 16 had never heard of adaptive beamforming in your life, have  
11:03:35 17 you, sir?

11:03:38 18 A. I don't think I had, no. I had heard of beamforming.  
11:03:42 19 But whether I had heard of adaptive, I don't exactly  
11:03:49 20 recall, but I don't believe I had.

11:03:50 21 Q. Well, when you were asked at your deposition when is  
11:03:54 22 the first time you ever heard of the term "adaptive  
11:03:57 23 beamforming," you said -- answer: When I was at Amazon.

11:03:59 24 A. Yeah.

11:04:00 25 Q. So that -- that's was after 2012, right?

11:04:02 1 A. Yeah.

11:04:02 2 Q. Okay. So in all your years of working in audio  
11:04:05 3 processing and reading textbooks and Brandstein, you never  
11:04:08 4 heard of adaptive beamforming before?

11:04:10 5 A. I had not read the Brandstein book before I got to  
11:04:14 6 Amazon.

11:04:15 7 Q. And we heard some testimony about your interview of  
11:04:20 8 Dr. Li in 2013?

11:04:23 9 A. That's correct.

11:04:23 10 Q. And that was --

11:04:26 11 MR. FABRICANT: If we could bring up exhibit --  
11:04:29 12 Plaintiff's Exhibit 130, please.

11:04:31 13 Q. (By Mr. Fabricant) Your interview apparently was on  
11:04:40 14 July 11, 2013, correct?

11:04:42 15 A. Yes.

11:04:42 16 Q. So you had been at Amazon six or seven months?

11:04:47 17 A. Eight months.

11:04:49 18 Q. Okay. And now you are interviewing Dr. Li in  
11:04:52 19 connection with this group you were working in, correct?

11:04:57 20 A. That's correct.

11:04:57 21 Q. And you were chastising him in your notes for not  
11:05:01 22 really being up to speed on beamforming; is that right?

11:05:04 23 A. No, I was not chastising him.

11:05:05 24 Q. Well, wasn't that one of your criticisms: I spent most  
11:05:11 25 of my time asking him technical questions about beamforming

11:05:14 1 and AEC. He did not do very well with several of the  
11:05:17 2 questions.

11:05:18 3 So you were criticizing his knowledge and  
11:05:20 4 understanding of beamforming, were you not?

11:05:22 5 A. Yeah, I was stating that he did not seem to know those  
11:05:26 6 topics very well.

11:05:27 7 Q. This Ph.D. who worked at Bell Labs, a renowned  
11:05:33 8 scientist, comes and interviews -- and you had only just  
11:05:37 9 heard the word "adaptive beamforming" a few month earlier,  
11:05:41 10 and you're criticizing his understanding. Is that right?

11:05:45 11 A. That's correct. He did not do well on my questions.

11:05:48 12 Q. And yet you said you were inclined -- inclined to, I  
11:05:57 13 guess, proceed in the hiring process, right?

11:05:58 14 A. He did not do well on my questions, but I wanted to  
11:06:02 15 give him the benefit of the doubt, that maybe there was  
11:06:04 16 some other area that he did know of.

11:06:06 17 Q. Now, from your own personal knowledge, sir, as you sit  
11:06:17 18 here today, prior to the filing of this lawsuit in April of  
11:06:20 19 2019, do you know whether any of those engineers who met  
11:06:23 20 with Dr. Li in October of 2011 ever looked at his patent?

11:06:31 21 A. No, I don't.

11:06:32 22 Q. Do you know whether they studied his patent?

11:06:34 23 A. No, I don't.

11:06:36 24 Q. Do you know whether they sent it on to anyone else at  
11:06:40 25 Amazon to study?

11:06:41 1 A. No, I do not.

11:06:42 2 Q. And that's because it's your corporate policy, don't  
11:06:45 3 read patents, even if you -- they're brought to your  
11:06:47 4 attention. Just close your eyes and deliberately ignore  
11:06:51 5 them. That's the policy, correct?

11:06:53 6 A. No, that's not the policy.

11:06:55 7 Q. What is the policy again? Please state it.

11:06:57 8 A. The policy is, if you do come across a patent that  
11:07:02 9 is -- might be of interest to Amazon, then to involve the  
11:07:06 10 patent attorneys and -- and send it on to them, connect  
11:07:13 11 with them, and they take it from there.

11:07:14 12 Q. But not to read the patent yourself?

11:07:18 13 A. Amazon doesn't stop you from reading patents. They  
11:07:20 14 generally discourage you from going on the USPTO site and  
11:07:25 15 trying to do research on them. But, you know, people on my  
11:07:29 16 team come across patents all the time. They're, you know,  
11:07:32 17 looking for stuff on the web and, you know, maybe a patent  
11:07:36 18 was mentioned here and there. So it's not -- we don't  
11:07:39 19 close our eyes and ignore them.

11:07:41 20 Q. Well, you heard the testimony by deposition, which was  
11:07:51 21 played for the jury, of your boss Aleksandar Pance, did you  
11:07:51 22 not?

11:07:51 23 A. Yes.

11:07:51 24 Q. And you heard him say it was the corporate policy not  
11:07:54 25 to read patents, not to look for patents, not to read them?

11:07:56 1 A. Yes, that's correct. As I said, we don't go on the  
11:08:00 2 USPTO site to research them.

11:08:01 3 Q. I didn't ask about going on the USPTO site. He said  
11:08:05 4 the policy was do not look at them; do not read them. He  
11:08:09 5 didn't say anything about forwarding them on to anybody,  
11:08:12 6 though, did he?

11:08:13 7 A. I don't recall.

11:08:13 8 Q. And he's your boss. You certainly would agree with his  
11:08:19 9 statement as to the corporate policy, would you not?

11:08:24 10 A. In general, yes, I'd agree with him.

11:08:26 11 MR. FABRICANT: Let's bring up, please,  
11:08:28 12 Plaintiff's Exhibit 78.

11:08:29 13 Q. (By Mr. Fabricant) Now, you were asked questions about  
11:08:36 14 this publication this morning, correct?

11:08:39 15 A. Yes, sir, that's right.

11:08:40 16 Q. And this is called a peer-reviewed article, is it not?

11:08:46 17 A. Yes, that's correct.

11:08:47 18 Q. And a peer-reviewed article is a publication which is  
11:08:51 19 proposed and then evaluated by a group of experts in the  
11:08:57 20 same field to review it for quality and accuracy. Isn't  
11:09:00 21 that what a peer-reviewed article is?

11:09:02 22 A. Yes.

11:09:03 23 Q. And that's what this was, right?

11:09:05 24 A. I believe so, yes.

11:09:06 25 Q. And it was not just reviewed by Amazon people, this



11:09:09 1 particular paper was submitted to the European Signal

11:09:15 2 Processing Conference of 2018, right?

11:09:19 3 A. That's correct.

11:09:19 4 Q. So this was not something that people were going to

11:09:22 5 read on the Internet or customers were going to look up how

11:09:24 6 to use Echo. This was going to scientists in this field

11:09:28 7 that you wanted to impress with your knowledge, correct?

11:09:31 8 A. It was going to scientists in the field, yes.

11:09:34 9 Q. Let's talk about the authors for a moment. I'd like to

11:09:37 10 ask you about the authors, please.

11:09:39 11 Amit Chhetri, is that the individual with the lab

11:09:44 12 notebook that we've been talking about?

11:09:45 13 A. That's correct.

11:09:45 14 Q. And then Philip Hilmes, that's you?

11:09:48 15 A. Yes.

11:09:48 16 Q. Trausti Kristjansson, is he an Amazon engineer, as

11:10:01 17 well?

11:10:01 18 A. He's a scientist manager who reports to me, yes.

11:10:03 19 Q. And Wai Chu, he's also an Amazon engineer, is he not?

11:10:08 20 A. Yes, he's also on my team.

11:10:10 21 Q. And Mohamed Mansour, is he an engineer at Amazon, as

11:10:16 22 well?

11:10:17 23 A. Yes, he is.

11:10:18 24 Q. And Xiaoxue Li, is he an engineer at Amazon?

11:10:22 25 A. Yes, Xiaoxue Li, she's on my team.

11:10:24 1 Q. And Xianxian Zhang, is that a name -- an Amazon  
11:10:29 2 engineer?

11:10:29 3 A. Xianxian Zhang, yes, she's on my team, as well.

11:10:33 4 Q. So we have seven Amazon engineers, all on your team,  
11:10:37 5 all who were co-authors of this peer-reviewed article that  
11:10:42 6 was presented at a scientific conference, correct?

11:10:44 7 A. Correct.

11:10:44 8 Q. You would certainly not mislead or falsify to this  
11:10:51 9 esteemed group that you were presenting this to, any facts,  
11:10:53 10 would you, Mr. Hilmes?

11:10:54 11 A. We were certainly not trying to falsify or mislead.

11:11:06 12 Q. Let's start and go through this piece-by-piece, please.

11:11:09 13 MR. FABRICANT: Let's highlight the first few  
11:11:12 14 sentences.

11:11:17 15 Q. (By Mr. Fabricant) Far-field automatic speech  
11:11:18 16 recognition, ASR, is a key enabling technology that allows  
11:11:21 17 untethered and natural voice interaction between users and  
11:11:25 18 Amazon Echo family of products.

11:11:34 19 Did I read that correctly?

11:11:35 20 A. Yes.

11:11:36 21 Q. A key component in realizing far-field ASR on these  
11:11:40 22 products --

11:11:40 23 A. Yes.

11:11:41 24 Q. When you say "these products," you mean Amazon Echo  
11:11:46 25 family of products, don't you? Is that a fair statement?

11:11:49 1 A. Yes.

11:11:49 2 Q. And the key is the suite of audio front end, AFE,  
11:11:57 3 algorithms.

11:11:58 4 That's what you wrote along with your colleagues,  
11:12:00 5 correct?

11:12:00 6 A. Yes, that's correct.

11:12:01 7 Q. And then the next sentence: In this paper, we discuss  
11:12:04 8 the key algorithms within the audio front end.

11:12:07 9 Correct? You wrote that?

11:12:10 10 A. Yes.

11:12:12 11 MR. FABRICANT: Now, could we go down to the  
11:12:16 12 bottom paragraph, staying in the left column.

11:12:20 13 Q. (By Mr. Fabricant) "One of the primary challenges"; do  
11:12:21 14 you see that?

11:12:22 15 MR. FABRICANT: If we could highlight a sentence  
11:12:24 16 or two.

11:12:24 17 Q. (By Mr. Fabricant) One of the primary challenges for  
11:12:26 18 Echo devices to scale to millions of households was to cope  
11:12:30 19 up with the unknown acoustical conditions in users' homes,  
11:12:36 20 which include varying levels of acoustic Echo, noise, and  
11:12:41 21 reverberation; the acoustic interference in the room can  
11:12:45 22 significantly impair the spoken utterance.

11:12:48 23 You and your colleagues wrote that, as well, did  
11:12:51 24 you not?

11:12:51 25 A. Yes, we did.

11:12:52 1 Q. And that was the problem that you were solving with the  
11:12:54 2 Echo device -- devices, was it not? That was the challenge  
11:12:57 3 for Echo, right?

11:12:58 4 A. Yeah, it was a challenge for the new Alexa service with  
11:13:05 5 the Echo devices.

11:13:06 6 MR. FABRICANT: And then if you go to the top of  
11:13:09 7 the next column. Up at the top, please.

11:13:12 8 Q. (By Mr. Fabricant) Echo devices use -- now, it does  
11:13:17 9 say "use," doesn't it?

11:13:18 10 A. Yes.

11:13:19 11 Q. Did I read it right?

11:13:21 12 A. Yes.

11:13:21 13 Q. It doesn't say sometimes use, maybe in the future will  
11:13:24 14 use, used to use but no longer use, it says "use," does it  
11:13:29 15 not?

11:13:29 16 A. It does.

11:13:30 17 Q. Echo devices use a highly specialized multichannel or  
11:13:34 18 multimicrophone, AFE, audio front end, which significantly  
11:13:38 19 improves the ASR and WW performance under a variety of  
11:13:42 20 acoustic conditions.

11:13:46 21 Then you state: Note that for the rest of the  
11:13:47 22 paper, we will use the term "smart-speaker" instead of  
11:13:53 23 Amazon Echo, to avoid confusion with the term "acoustic  
11:13:56 24 echo."

11:13:57 25 You wrote that, correct?

11:13:57 1 A. Somebody on my team wrote that, yes.

11:14:00 2 Q. But just -- I'm asking the question, Amazon Echo was  
11:14:04 3 still the smart-speaker system that you were referring to,  
11:14:09 4 not something else, true?

11:14:10 5 A. No, I can't say that for sure.

11:14:15 6 Q. Well, doesn't it say: For the rest of the paper, we  
11:14:18 7 will use the term "smart-speaker" instead of Amazon Echo,  
11:14:23 8 to avoid confusion with the term "acoustic echo."

11:14:27 9 Isn't that what it says?

11:14:29 10 A. That is what it says.

11:14:30 11 Q. Does it say: We're going to refer to some other  
11:14:30 12 systems from now on, but they're not really the Echo.

11:14:33 13 Does it say that?

11:14:34 14 A. No, it doesn't say that.

11:14:35 15 Q. And then the next paragraph, you and your authors  
11:14:40 16 write: This paper is organized as follows.

11:14:42 17 Do you see that paragraph, Mr. Hilmes?

11:14:45 18 A. Yes.

11:14:46 19 Q. And it tells you how it's organized. In Section 2, we  
11:14:50 20 present the far-field acoustic environment for smart  
11:14:53 21 speakers for Amazon Echo.

11:14:55 22 That's -- that's what it says, isn't it?

11:14:57 23 A. Correct.

11:14:58 24 Q. And then in Section 3, we present the overall system  
11:15:02 25 model and its key metrics.

11:15:04 1 It says that, doesn't it?

11:15:06 2 A. Yes.

11:15:06 3 Q. And then it says in Section 4, we provide insights into  
11:15:10 4 the various approaches, signal processing, DNN, employed to  
11:15:14 5 mitigate the acoustic challenges.

11:15:16 6 It does say "employed," does it not, sir?

11:15:19 7 A. Yes, it does.

11:15:20 8 Q. And then it says Section 5 provides experimental  
11:15:25 9 results.

11:15:27 10 So the experimental results are in Section 5; you  
11:15:31 11 agree with that?

11:15:31 12 A. Yes.

11:15:43 13 MR. FABRICANT: So now turn to Paragraph 3 on the  
11:15:46 14 next page, please.

11:15:50 15 Q. Starts with the words: A smart-speaker's response time  
11:15:54 16 to the wake word is a very important metric as it strongly  
11:15:58 17 ties to the user experience. In addition, users also want  
11:16:02 18 the device to respond to their queries with a high  
11:16:06 19 accuracy. In order to meet latency, bandwidth, and  
11:16:09 20 performance constraints, we adopt the system model depicted  
11:16:12 21 in Figure 2.

11:16:13 22 And that's a reference to Figure 2 up at the top  
11:16:16 23 right of the page; is that right?

11:16:17 24 A. Yes, it is.

11:16:22 25 Q. And this already is taking into consideration the fact

11:16:25 1 that you want very quick response time for the wake word?

11:16:29 2 Is that an accurate statement?

11:16:31 3 A. I don't see anything in that diagram that refers to  
11:16:34 4 latency.

11:16:34 5 Q. I'm just asking you, this is the figure, sir, that's  
11:16:38 6 referred to in the paragraph that I just read --

11:16:40 7 A. Yes, that's correct, sorry, yes.

11:16:44 8 THE COURT: Let's make sure that the question is  
11:16:46 9 finished before the answer is given, and the answer is  
11:16:49 10 finished before the next question is asked.

11:16:51 11 THE WITNESS: Yes, Your Honor.

11:16:52 12 MR. FABRICANT: Yes, sir.

11:16:53 13 THE COURT: All right. Proceed.

11:16:59 14 MR. FABRICANT: Now, if we could go to the  
11:17:00 15 paragraph in the right column down beginning with the word  
11:17:04 16 "spatial processing algorithms."

11:17:07 17 Q. (By Mr. Fabricant) It reads: Spatial processing  
11:17:10 18 algorithms, such as beamformers, need an estimate of the  
11:17:13 19 user's bearings, i.e., look-direction, w.r.t. the device.  
11:17:23 20 For this, we use source localization algorithms to  
11:17:28 21 determine the likely direction of the active user.

11:17:30 22 Do you see that, Mr. Hilmes?

11:17:31 23 A. Yes, I see that.

11:17:33 24 Q. But you say you don't use sound source localization in  
11:17:36 25 the Echo devices, correct?

11:17:37 1 A. That's correct.

11:17:44 2 Q. So this paragraph does not accurately refer to what was  
11:17:47 3 actually in the Echo device as of 2018; is that your  
11:17:51 4 testimony?

11:17:52 5 A. Yes, that's my testimony.

11:17:53 6 Q. And then it continues: We also make use of a  
11:18:04 7 sophisticated system-state control, SSC, module, which  
11:18:09 8 takes into account the various system states, e.g.,  
11:18:14 9 talker/playback is active, Alexa is responding, noise  
11:18:23 10 cancelation, which are then used to control the various  
11:18:26 11 audio algorithms.

11:18:26 12 So that's Alexa that's responding to this,  
11:18:28 13 that's -- that's Echo Alexa, is it not?

11:18:31 14 A. Yes.

11:18:31 15 Q. There's no other Alexa, correct?

11:18:31 16 A. That's correct.

11:18:34 17 Q. So you would agree that the reader would read this as  
11:18:37 18 the Echo device using Amazon Alexa, and that this is how it  
11:18:41 19 works; that's what these engineers who were reading this  
11:18:43 20 would have understood. Correct?

11:18:45 21 A. It was meant to -- that was not the intent, no. But  
11:18:51 22 it's possible somebody could have understood it that way.

11:18:54 23 Q. Possible? Is there anything in here that says, but we  
11:18:57 24 don't do this; this is all speculation?

11:19:00 25 A. We don't explicitly say that we don't do it. We don't



11:19:05 1 explicitly say that we do do it.

11:19:07 2 Q. But the whole paper is about the Amazon Echo and the  
11:19:11 3 algorithms you use; isn't that right?

11:19:11 4 A. It's about the algorithms we've investigated.

11:19:15 5 Q. Continuing in the same paragraph: Lastly, the AFE,  
11:19:20 6 audio front end, also receives audio content such as music  
11:19:30 7 and speech, paren, e.g., Alexa response, from the Cloud,  
11:19:35 8 which is processed by playback enhancement algorithms, for  
11:19:38 9 optimal sound experience, before being sent to the device's  
11:19:42 10 loudspeakers.

11:19:43 11 Did I read it correctly?

11:19:44 12 A. Yes.

11:19:45 13 Q. And then it states: In the following, we present the  
11:19:48 14 major AFE, audio front end, algorithms in more detail.

11:19:53 15 Now, there's a block at the top of the next page,  
11:20:02 16 sir, and this block specifically shows source localization  
11:20:08 17 and tracking, does it not?

11:20:09 18 A. Yes, it has a block for that.

11:20:10 19 Q. And it shows spatial processing and MCAEC, does it not?

11:20:16 20 A. That's correct.

11:20:16 21 Q. And it shows real-time system-state control, real-time,  
11:20:21 22 does it not?

11:20:21 23 A. Yes, it does.

11:20:31 24 MR. FABRICANT: Now, if we could go to the bottom  
11:20:33 25 of this column, beginning with the words: The F&S

11:20:39 1 processing.

11:20:40 2 Q. (By Mr. Fabricant) Do you see that? The F&S  
11:20:43 3 processing, is that filter-and-sum? Is that what F&S  
11:20:48 4 means?

11:20:48 5 A. Yes, it is.

11:20:48 6 Q. And it reads: The F&S processing can be broadly  
11:20:53 7 divided into two categories, A, fixed beamformer, FBF; and  
11:21:00 8 B, adaptive beamformer, ABF, where the  $w_m$ 's are both time  
11:21:10 9 and signal dependent.

11:21:12 10 Is that what it says?

11:21:14 11 A. That is what it says, sir.

11:21:16 12 Q. So, in this article, in this paragraph, you are  
11:21:18 13 specifically writing to the reader that you have both fixed  
11:21:22 14 beamformer and adaptive beamformer in these algorithms,  
11:21:28 15 correct?

11:21:28 16 A. We are -- we are speaking about both of those  
11:21:30 17 algorithms here, yes.

11:21:31 18 Q. And, again, is this the -- the real adaptive beamformer  
11:21:36 19 or the one where you use the words "adaptive beamformer,"  
11:21:40 20 but it's not really adaptive beamformer? Which one is  
11:21:44 21 this?

11:21:44 22 A. This would be the real one, because that's what's known  
11:21:47 23 in the -- in the industry.

11:21:48 24 Q. And what is time and signal dependent? What does that  
11:21:54 25 mean?

11:21:54 1 A. That means that the beamformer is changing with time  
11:21:58 2 and with the signal.

11:22:03 3 Q. And that's something that you have testified to today  
11:22:05 4 in this court that the Echo devices from the beginning have  
11:22:08 5 not done, correct, sir?

11:22:09 6 A. That's correct. We have fixed coefficients. They  
11:22:13 7 don't change.

11:22:18 8 MR. FABRICANT: And then if we can go to the next  
11:22:20 9 column up near the top, second paragraph.

11:22:24 10 Q. (By Mr. Fabricant) The smart-speaker uses  
11:22:27 11 beamforming -- so that's the Amazon Echo uses beamforming  
11:22:31 12 algorithms -- that employ auxiliary SSC and sound source  
11:22:41 13 localization algorithms in order to adapt to and mitigate a  
11:22:45 14 variety of real-life challenging noise conditions.

11:22:48 15 Did I read it correctly, sir?

11:22:51 16 A. No.

11:22:51 17 Q. What was incorrect?

11:22:54 18 A. You substituted "Amazon Echo" in there.

11:22:58 19 Q. For smart-speaker, right?

11:22:58 20 A. It says, "the smart-speaker," which you identified at  
11:22:59 21 the beginning of the article as the Amazon Echo. So what  
11:23:01 22 was wrong with what I did?

11:23:03 23 Q. It's -- just says a smart-speaker. It doesn't say the  
11:23:07 24 Amazon Echo.

11:23:08 25 Q. Is there any other smart-speaker, Mr. Hilmes, that you

11:23:11 1 identify anywhere in this article? Could you point out to  
11:23:14 2 the jury -- take all the time you need -- point out the  
11:23:18 3 name of another smart-speaker.

11:23:19 4 A. No, it doesn't call out any other smart-speakers.

11:23:22 5 Q. So it calls out the Amazon Echo smart-speaker, right?

11:23:27 6 A. Yeah, as an example.

11:23:31 7 Q. And then you write: These algorithms have been  
11:23:34 8 designed using several hundred hours of real-world noisy  
11:23:40 9 speech. Those are the several -- several hundred hours of  
11:23:42 10 real hours of real-world noisy speech that you developed  
11:23:44 11 for Echo; isn't that right?

11:23:53 12 A. The -- these are algorithms that we experimented with.  
11:23:56 13 They are not algorithms that went into the Echo.

11:23:59 14 Q. It's -- well, let me ask you this, Mr. Hilmes. We're  
11:24:04 15 in Section 4 of your article. Will you agree with that?

11:24:06 16 A. Yes.

11:24:07 17 Q. We are not in Section 5, which is -- is where you set  
11:24:10 18 forth experimental issues, is it?

11:24:14 19 A. No, we're not.

11:24:20 20 Q. So it should have been in 5. Was this a mistake when  
11:24:23 21 the seven of you got together and you went through this  
11:24:26 22 important scientific paper? It was like, oops, we -- we  
11:24:29 23 should have put it in experimental, but it's not, it's in  
11:24:32 24 4, which means it really exists? Was that a mistake?

11:24:35 25 A. I'm -- I'm sorry. What is this mistake you're talking

11:24:39 1 about?

11:24:39 2 Q. Was this a mistake? Should this have been an

11:24:44 3 experimental paragraph rather than an actual?

11:24:47 4 A. Perhaps. I mean, I -- I don't see any issue with

11:24:53 5 referring to it here, though, that we collected a lot of

11:24:57 6 data when designing these algorithms.

11:25:17 7 MR. FABRICANT: Your Honor, I pass the witness.

11:25:19 8 THE COURT: Redirect by the Defendant?

11:25:21 9 MR. HADDEN: Thank you, Your Honor.

11:25:21 10 REDIRECT EXAMINATION

11:25:21 11 BY MR. HADDEN:

11:25:21 12 Q. Okay, Mr. Hilmes.

11:25:57 13 MR. HADDEN: Could we look at the paper that was  
11:25:59 14 just up, Plaintiff's 301, please, Mr. Berk?

11:25:59 15 Q. (By Mr. Hadden) What's the purpose for peer-review in  
11:26:02 16 a scientific journal, Mr. Hilmes?

11:26:04 17 A. Peer-review is to basically give feedback on the paper  
11:26:09 18 about its technical merits.

11:26:13 19 Q. Okay. And do peer-reviewers try to figure out how  
11:26:16 20 actual products work?

11:26:19 21 A. No.

11:26:19 22 Q. Is the purpose of writing a technical argument --  
11:26:24 23 tech -- strike that.

11:26:25 24 Is the purpose of writing a technical paper to  
11:26:29 25 submit to a peer-reviewed scientific journal to describe

11:26:34 1 how a specific product works?

11:26:37 2 MR. FABRICANT: Objection, Your Honor.

11:26:39 3 THE COURT: State --

11:26:39 4 MR. FABRICANT: Leading, Your Honor.

11:26:40 5 THE COURT: Sustained.

11:26:42 6 Q. (By Mr. Hadden) What's the purpose for providing a

11:26:44 7 technical paper to a peer-reviewed journal, Mr. Hilmes?

11:26:47 8 A. The purpose of providing a paper like this is to share

11:26:55 9 with the scientific community our learnings about things

11:27:01 10 that we have worked on, and -- and then the -- the

11:27:05 11 peer-reviewers will give us feedback on whether they think

11:27:10 12 we have something technically interesting.

11:27:13 13 MR. HADDEN: Can we go to the page with the Bates

11:27:19 14 No. 575, please, Mr. Berk, and that heading 4.1.1,

11:27:25 15 Signaling Processing-Based Beamforming. And can we blow up

11:27:33 16 the paragraph right underneath the equation there,

11:27:37 17 Mr. Berk? Thank you.

11:27:38 18 Q. (By Mr. Hadden) Could you explain the two types of

11:27:48 19 beamforming that are described here?

11:27:49 20 A. Yes. We refer to both fixed beamforming and adaptive

11:27:54 21 beamforming. And within those two categories, there's lots

11:27:58 22 of different kinds. Fixed beamforming is what we do on the

11:28:03 23 Echo using super directive beamformer, fixed coefficients,

11:28:09 24 as I mentioned before -- you know, those coefficients don't

11:28:12 25 change. Those beams are fixed. And the position that they

11:28:16 1 were made in.

11:28:17 2 And -- and adaptive beamforming, that's just one  
11:28:19 3 beam that's getting steered to a particular direction that  
11:28:24 4 the device has determined to be of interest. And that's --  
11:28:31 5 we do not do that. We do not steer any beam.

11:28:34 6 MR. HADDEN: If we go to the next paragraph,  
11:28:36 7 please, Mr. Berk.

11:28:39 8 Q. (By Mr. Hadden) It starts out and it says: The FBF --  
11:28:43 9 does that stand for fixed beamforming?

11:28:45 10 A. Yes, that's correct, sir.

11:28:47 11 Q. It says: The FBF is typically designed by posing the  
11:28:51 12 beamformer design as a constrained optimization problem.  
11:28:55 13 And it goes in and says: E.g., super directive beamformer  
11:28:58 14 and its variants.

11:29:00 15 Do you see that?

11:29:01 16 A. Yes, I do.

11:29:01 17 Q. Is -- is that what Amazon does to find those weights  
11:29:10 18 offline?

11:29:10 19 A. Yes, that's correct.

11:29:11 20 Q. And it continues and says: For ABF -- does that stand  
11:29:16 21 for traditional adaptive beamforming?

11:29:18 22 A. Yes, that's correct, the traditional adaptive  
11:29:21 23 beamformer.

11:29:21 24 Q. It says: The filters  $w_m$ 's -- are those those weights  
11:29:28 25 we've been talking about?

11:29:28 1 A. Yes.

11:29:29 2 Q. It says: Those are optimized in real-time depending on  
11:29:33 3 the signal conditions.

11:29:34 4 Do you see that?

11:29:35 5 A. I do see that.

11:29:36 6 Q. And what did you mean optimized in real-time depending  
11:29:39 7 on the signal conditions?

11:29:40 8 A. That means they're being calculated based on what the  
11:29:43 9 incoming signals are.

11:29:44 10 Q. Okay. And does the Echo do that?

11:29:49 11 A. No, it does not. Those coefficients don't change on  
11:29:52 12 the Echo. They're the same numbers from the day we put  
11:29:55 13 them in there unless we do a software update.

11:29:58 14 Q. And the -- at the time you submitted this paper, this  
11:30:00 15 technical journal, had Amazon experimented with both of  
11:30:04 16 these approaches?

11:30:05 17 A. Yes, we have.

11:30:07 18 Q. Okay. Now, if we go to the result section that  
11:30:13 19 Vocalife's counsel was asking you about, is it typical to  
11:30:16 20 have a section of a peer-reviewed journal that has the  
11:30:21 21 empirical results of the experiments?

11:30:24 22 A. Yes.

11:30:25 23 Q. Is that typically called the experimental result  
11:30:28 24 section?

11:30:28 25 A. That's correct.



11:30:29 1 Q. And is that what we see here?

11:30:31 2 A. In Section 5, yes.

11:30:36 3 MR. HADDEN: And if we go to the next page,

11:30:41 4 Mr. Berk, there are some tables. Can we blow those up?

11:30:45 5 Q. (By Mr. Hadden) And are these some of the experimental  
11:30:48 6 results from using the various algorithms described in this  
11:30:51 7 paper?

11:30:51 8 A. Yes, that's correct.

11:30:58 9 MR. HADDEN: Pass the witness.

11:30:59 10 THE COURT: Further cross-examination?

11:31:00 11 MR. FABRICANT: Yes, Your Honor.

11:31:02 12 THE COURT: Proceed.

11:31:02 13 RECROSS-EXAMINATION

11:31:02 14 BY MR. FABRICANT:

11:31:02 15 Q. Mr. Hilmes, Mr. Hadden just asked you a question  
11:31:07 16 referring to a paragraph in the article.

11:31:10 17 MR. FABRICANT: So if we could bring back up  
11:31:14 18 Plaintiff's 78. Well, we can use this version. This is --  
11:31:18 19 this is -- what's the defense number, please? This is  
11:31:24 20 Plaintiff's 301.

11:31:26 21 If we can go to Page 5575, Bates number, on the  
11:31:32 22 bottom, lower paragraph.

11:31:34 23 Q. (By Mr. Fabricant) I believe you were just asked  
11:31:36 24 questions about this. And with respect to for ABF,  
11:31:44 25 adaptive beamforming, the filters  $w_m$ 's are organ --

11:31:47 1 optimized in real-time depending on the signal conditions.

11:31:50 2 Do you recall just being asked about that a moment  
11:31:53 3 ago?

11:31:54 4 A. Yes, sir.

11:31:54 5 Q. And you were asked whether Echo did that, right?

11:31:57 6 A. That's correct.

11:31:57 7 Q. And you said, no, I believe, right?

11:31:59 8 A. That's correct.

11:31:59 9 Q. That's what the patent does, though? Isn't that what  
11:32:02 10 the patent teaches and discloses? Isn't that what the  
11:32:05 11 patent claims, sir?

11:32:06 12 A. The patent claims to be steering a beam, yes.

11:32:10 13 Q. So you agree that this is what you read in Claim 1 of  
11:32:14 14 the patent, this kind of adaptive beamforming, true?

11:32:16 15 A. That's part of the patent, yes.

11:32:20 16 MR. FABRICANT: Thank you, Your Honor.

11:32:20 17 THE COURT: Further direct, Mr. Hadden?

11:32:23 18 MR. HADDEN: No, Your Honor.

11:32:24 19 THE COURT: You may step -- step down, Mr. Hilmes.

11:32:27 20 THE WITNESS: Thank you, sir.

11:32:28 21 THE COURT: Defendants, call your next witness.

11:32:39 22 MR. HADDEN: Your Honor, we're going to call  
11:32:41 23 Matthew Holland by video trial deposition, Your Honor.

11:32:45 24 THE COURT: All right. Proceed with your witness  
11:32:48 25 by deposition.

11:32:50 1 MS. DOAN: Your Honor, Jennifer Doan for Amazon.

11:32:55 2 We're now calling Matthew Holland by video trial  
11:32:59 3 deposition. Mr. Holland is an electrical engineer formerly  
11:32:59 4 employed by Amazon, currently employed by Postmates.

11:33:08 5 The total time is 24 minutes and 29 seconds.  
11:33:09 6 Allocated for the Plaintiff, 5 minutes and 57 seconds; the  
11:33:13 7 Defendant, 18 minutes and 32 seconds.

11:33:15 8 THE COURT: All right. Proceed with this witness  
11:33:16 9 by deposition.

11:33:16 10 MATTHEW HOLLAND, DEFENDANTS' WITNESS

11:33:21 11 PRESENTED BY VIDEO DEPOSITION

11:33:21 12 (Videoclip played.)

11:33:22 13 Q. Mr. Holland, would you please introduce yourself to the  
11:33:35 14 jury?

11:33:35 15 A. Yes. Hello, my name is Matt Holland. I'm an  
11:33:40 16 electrical engineer. I live in Oakland, California.  
11:33:43 17 Formerly, I was employed by Amazon. Currently I'm employed  
11:33:46 18 by Postmates.

11:33:47 19 Q. Thank you, Mr. Holland.

11:33:50 20 You understand we're here today to take your trial  
11:33:53 21 deposition by videoconference?

11:33:56 22 A. Yes, I understand.

11:33:57 23 Q. Can you tell us -- you told us that you worked for  
11:34:04 24 Postmates now. What do you do for Postmates?

11:34:06 25 A. Yeah, Postmates, I'm part of the team that's working on

11:34:11 1 food delivery robots.

11:34:12 2 Q. And tell us a little bit about your education, where  
11:34:15 3 you were educated, when, et cetera?

11:34:17 4 A. Yeah, I have an electrical engineering degree from the  
11:34:21 5 University of California Berkeley, strictly a computer  
11:34:24 6 science and electrical engineering degree, Bachelor's. I  
11:34:27 7 received that at the end of 2009.

11:34:29 8 Q. Thank you. And you said you used to work for Amazon?

11:34:32 9 A. Correct.

11:34:33 10 Q. When did you work for Amazon?

11:34:35 11 A. I worked for Amazon from early 2011 to mid-2015.

11:34:42 12 Q. Who did you work for between when you graduated from  
11:34:45 13 the University of California Berkeley in '09 and when you  
11:34:48 14 came to work for Amazon in 2011?

11:34:50 15 A. I worked for a company called Uniquify.

11:34:56 16 Q. Okay. And you were there shortly about a year; is that  
11:34:59 17 right?

11:34:59 18 A. Yeah. Let's see, it would have been maybe slightly  
11:35:02 19 over a year.

11:35:04 20 Q. How long did you work for Amazon?

11:35:07 21 A. Approximately four and a half years.

11:35:09 22 Q. Okay. So from 2011 to 2015?

11:35:11 23 A. '15, yeah.

11:35:13 24 Q. And what did you do for Amazon?

11:35:16 25 A. I was an electrical engineer on the hardware team. So

11:35:20 1 I was responsible for electrical implementation of the  
11:35:23 2 circuits, schematics, layouts, circuit board development,  
11:35:28 3 that sort of thing.

11:35:28 4 Q. When you say you're an electrical engineer on the  
11:35:31 5 hardware team, I want to make sure I'm fully understanding  
11:35:34 6 that. Is that for the products that Amazon was making?

11:35:38 7 A. Yes.

11:35:38 8 Q. Mr. Holland, in 2011, were you working on Amazon's Fire  
11:35:43 9 Phone?

11:35:43 10 A. Yes.

11:35:43 11 Q. Can you tell us what that Amazon Fire Phone was?

11:35:49 12 A. Yeah. The Amazon Fire Phone was a smartphone. It was  
11:35:54 13 Amazon's entry into that market; so similar to an iPhone or  
11:35:57 14 an Android phone.

11:36:00 15 Q. And did you have an Amazon Fire Phone?

11:36:03 16 A. Yeah. After it was released, I used the Amazon Fire  
11:36:09 17 Phone as my smartphone for a couple of years.

11:36:11 18 Q. When you came to work at Amazon in 2011, were you  
11:36:13 19 working on the Fire Phone in the electrical engineering  
11:36:17 20 department?

11:36:17 21 A. Yes. I -- I joined Amazon -- I did not know I would be  
11:36:23 22 working on that project at the time, due to secrecy, but I  
11:36:27 23 was hired into the Amazon Fire Phone team.

11:36:29 24 Q. Do you recall a meeting on October 17, 2011, between  
11:36:36 25 Amazon and Li Creative Technologies and Dr. Peter Li?

11:36:39 1 A. Yes, I do.

11:36:45 2 Q. Why -- why do you remember that meeting?

11:36:47 3 A. Oh, I remember that meeting specifically because it was  
11:36:55 4 brief, and I remember that there was a demo that didn't go  
11:36:58 5 particularly well. And I remember that we were -- we left  
11:37:02 6 the meeting feeling fairly unimpressed with how it went.

11:37:07 7 Q. Okay. Who was at the meeting, sir?

11:37:11 8 A. It would have been myself, Sergei Alexandrov, and Aleks  
11:37:11 9 Pance. And, of course, Peter Li.

11:37:24 10 Q. Do you remember anybody else being at the meeting?

11:37:26 11 A. I do not.

11:37:27 12 Q. Prior to the meeting -- I'm going to show you -- I'm  
11:37:30 13 going to show you Exhibit No. 1018. It's DTX. It's  
11:37:33 14 already admitted.

11:37:34 15 This is a copy of a nondisclosure agreement that  
11:37:37 16 appears to be signed by Dr. Peter Li, as well as a  
11:37:40 17 representative from Amazon, Lindo St. Angel. Do you see  
11:37:49 18 that?

11:37:50 19 A. I do.

11:37:51 20 Q. Are you aware that mutual nondisclosure agreements are  
11:37:53 21 usually signed before these types of meetings?

11:37:55 22 A. Yes.

11:37:56 23 Q. What type of meeting did Amazon have with Dr. Li in  
11:38:01 24 2011?

11:38:01 25 A. It was a pitch meeting followed by a demo.

11:38:06 1 Q. Had you been to -- when you say it's a pitch meeting,  
11:38:11 2 what do you mean by that?

11:38:12 3 A. I mean that it was a -- it was a presentation of a  
11:38:19 4 slide deck and overview of the company's technologies and  
11:38:22 5 capabilities.

11:38:25 6 Q. Had you been to other pitch meetings either before this  
11:38:28 7 meeting in October of 2011 or after that meeting?

11:38:31 8 A. Yes, I had.

11:38:33 9 Q. How long do pitch meetings last?

11:38:36 10 A. Typically about an hour.

11:38:37 11 Q. And how long did this meeting with Dr. Li last?

11:38:42 12 A. About an hour.

11:38:43 13 Q. I'm going to show you some PowerPoint slides that  
11:38:48 14 Dr. Li has testified that he showed to Amazon during the  
11:38:51 15 meeting on October 17, 2011. It's marked as PTX-45.

11:38:55 16 Do you see this exhibit, sir?

11:39:00 17 A. Yes, I do.

11:39:06 18 Q. Have you had time to scroll through the exhibit?

11:39:10 19 A. Yes, I have.

11:39:11 20 Q. What was your impression of this slide deck, PTX-45, at  
11:39:17 21 the October 2011 meeting?

11:39:20 22 A. My impression is that it's a high-level slide deck, so  
11:39:25 23 there's a lot of general terms concerning the technologies  
11:39:33 24 that -- that they -- they offer.

11:39:37 25 Q. Okay. Why were you at this meeting, sir? What was

11:39:40 1 your role?

11:39:41 2 A. My role is as a member of the -- the electrical  
11:39:45 3 engineering team for the Amazon Fire Phone. And I was  
11:39:48 4 specifically responsible for the audio subsystem of the  
11:39:51 5 Fire Phone in terms of its electrical details. So I worked  
11:39:55 6 closely with the audio team.

11:39:56 7 Q. Okay. And you mentioned that Aleks Pance and Sergei  
11:40:04 8 Alexandrov were there for the audio team, as well?

11:40:08 9 A. That's right. Aleks Pance was the head of the systems  
11:40:14 10 team of which the audio team was part of.

11:40:14 11 Q. What does Exhibit DTX-181 say?

11:40:17 12 A. There's an email header, and then it says: Not  
11:40:20 13 impressed with Li Creative Tech. Evaluate audience.  
11:40:25 14 10/24.

11:40:28 15 Q. Do you agree that -- with Exhibit DTX-181?

11:40:32 16 A. Yes, I agree.

11:40:34 17 Q. What do you recall from the demonstration you mentioned  
11:40:39 18 that Dr. Li showed to Amazon?

11:40:43 19 A. I recall that he had a setup with the computer and a  
11:40:48 20 mock-up of a device. And from my memory, there was a -- a  
11:40:57 21 demonstration of samples being played back through their --  
11:41:06 22 their processing technologies demonstrating their noise  
11:41:09 23 cancellation and -- and so on.

11:41:10 24 Q. Why do you agree with the statement "not impressed with  
11:41:18 25 Li Creative Tech" on Exhibit No. DTX-181?



11:41:22 1 A. The demonstration, from my memory, did not go very  
11:41:26 2 well. From my memory, it did not demonstrate any  
11:41:33 3 capabilities that would have been beneficial to us.

11:41:35 4 I also remember that Sergei Alexandrov, who was  
11:41:41 5 the lead of the audio team, was also not impressed. He had  
11:41:45 6 asked a number of questions that received dissatisfactory  
11:41:49 7 answers during the demo.

11:41:52 8 Q. I'm focusing back on DTX-181. Do you see the date  
11:41:55 9 there is 10/17/2011, the date of the meeting; is that  
11:42:00 10 right?

11:42:00 11 A. That is what -- the date that's in the subject line,  
11:42:04 12 yes.

11:42:04 13 Q. Okay. Do you recall any of Mr. Alexandrov's specific  
11:42:14 14 questions or why the answers were unsatisfactory?

11:42:16 15 A. Yes. I recall his questions had to do with the  
11:42:19 16 positioning of the devices in question and how it handled  
11:42:24 17 different acoustic environments.

11:42:26 18 Q. Okay. And you recall that the answers that Dr. Li gave  
11:42:29 19 were unsatisfactory; is that right?

11:42:31 20 A. I do recall that.

11:42:33 21 Q. What do you recall of Dr. Li's answers to  
11:42:40 22 Mr. Alexandrov's questions?

11:42:41 23 A. I don't recall in detail his answers. I merely recall  
11:42:46 24 that his answers were unsatisfactory to Sergei Alexandrov.

11:42:52 25 Q. And did you also agree that his answers were

11:42:54 1 unsatisfactory?

11:42:54 2 A. At the time, I would say that I didn't have a strong  
11:43:06 3 personal opinion about his answers but relied more heavily  
11:43:09 4 on Sergei's interpretation of his answers, Sergei  
11:43:14 5 Alexandrov's interpretation.

11:43:16 6 Q. After a general pitch meeting, if Amazon wants to go  
11:43:21 7 forward with a specific vendor, what does Amazon do?

11:43:24 8 A. Amazon would then contact the vendor and arrange for  
11:43:30 9 further engagement, which would involve somehow evaluating  
11:43:35 10 their technology in our own labs so that we could further  
11:43:38 11 test the capabilities of what they were offering.

11:43:40 12 Q. Does this further next steps also require an engagement  
11:43:47 13 agreement with the vendor, as well?

11:43:49 14 A. Yes, it does.

11:43:50 15 Q. Did Amazon enter into any engagement agreement or take  
11:43:56 16 any further steps with Dr. Li other than the general pitch  
11:44:00 17 meeting?

11:44:01 18 A. Not to my knowledge, no.

11:44:02 19 Q. Did Amazon decide not to go forward with any technology  
11:44:12 20 of Li Creative or Dr. Peter Li?

11:44:15 21 A. Correct. We did not go forward.

11:44:20 22 Q. Did you agree with the decision not to go forward?

11:44:23 23 A. Yes, I agreed.

11:44:24 24 Q. Mr. Holland, did you or anyone else at Amazon take  
11:44:33 25 anything from or copy anything from the meeting with

11:44:37 1 Dr. Peter Li and Li Creative Technologies that was held on  
11:44:42 2 October 17th, 2011?

11:44:44 3 A. We would have received a copy of the slide deck that  
11:44:46 4 was presented. Other than that, we did not receive  
11:44:48 5 anything.

11:44:50 6 Q. Okay. At any time, did Amazon or did you take or copy  
11:44:56 7 anything from Dr. Peter Li that was used in Amazon's  
11:44:59 8 technologies?

11:45:00 9 A. No, we did not.

11:45:02 10 Q. Did you ever see Dr. Peter Li or anyone from Li  
11:45:07 11 Creative Technologies after that meeting?

11:45:10 12 A. No, I did not.

11:45:13 13 Q. When you worked at Amazon, you worked on the Echo Dot,  
11:45:17 14 correct?

11:45:17 15 A. Correct.

11:45:18 16 Q. So approximately per year, how many -- how many  
11:45:28 17 suppliers would you meet with?

11:45:29 18 A. Oh, I would say that we would have a meeting with a  
11:45:36 19 supplier or a third-party company approximately once every  
11:45:43 20 week or two, so 26 to 52 meetings, one could say. That  
11:45:47 21 might be estimating a little high, but, again, it's just an  
11:45:50 22 estimate and a guess.

11:45:51 23 Q. Why would you primarily meet with an integrated circuit  
11:45:55 24 company?

11:45:55 25 A. Because I'm an electrical engineer, and we use

11:45:59 1 components made by integrated circuit companies in our  
11:46:04 2 designs.

11:46:04 3 Q. So you're not a software guy, correct?

11:46:06 4 A. Correct. Meaning that I'm not a professional software  
11:46:16 5 engineer.

11:46:16 6 Q. And you don't program or develop algorithms, correct?

11:46:19 7 A. Not as part of my job, no. Occasionally, I may do some  
11:46:26 8 scripting to help my job out, but I do not develop code  
11:46:30 9 that gets shipped in any products.

11:46:34 10 Q. And in other cases, Amazon would reach out to those  
11:46:37 11 companies, correct?

11:46:40 12 A. I don't see why not.

11:46:43 13 Q. Before meeting with companies, would your team perform  
11:46:51 14 an investigation of that company's offerings or products?

11:46:57 15 A. I'm not sure what type of investigations would be  
11:46:59 16 carried out in general.

11:47:01 17 Q. And prior to inviting Li Creative in for a meeting,  
11:47:11 18 Amazon reviewed one or more products or offerings from Li  
11:47:22 19 Creative, correct?

11:47:23 20 A. I'm not aware of what reviews were done.

11:47:27 21 Q. You're personally not aware of any investigation or  
11:47:34 22 examination of Li Creative's products that occurred before  
11:47:38 23 the October 2011 meeting; is that correct?

11:47:43 24 A. None that were in the context of this meeting, no.

11:47:46 25 Q. Why do you say "none that were within the context of

11:47:52 1 this meeting"?

11:47:54 2 A. Because I purchased one of their products earlier in  
11:47:58 3 the year, but that was not in relation to this meeting in  
11:48:03 4 any way.

11:48:04 5 Q. Why did it have no relation to this meeting?

11:48:08 6 A. Because I was not purchasing this product in the  
11:48:13 7 context of trying to determine if this was a company that  
11:48:17 8 we wanted to meet with.

11:48:18 9 Q. Why were you purchasing the product?

11:48:23 10 A. I was trying to educate myself on the topic of  
11:48:26 11 beamforming, and that was the first product link that came  
11:48:29 12 up when I searched for it on Amazon.

11:48:31 13 Q. When you worked at Amazon, was there a policy in  
11:48:39 14 dealing with disclosures of patents from third parties?

11:48:49 15 A. That, I'm not sure.

11:48:52 16 Q. Why didn't it stand out to you?

11:48:55 17 A. Because I'm more interested in the details of the  
11:49:01 18 technology, not the legal details or the patent details.  
11:49:12 19 If I had a question about patents or law, I would refer to  
11:49:16 20 my manager or the counsel at Amazon.

11:49:18 21 Q. Earlier, you said that Li Creative's pitch stood out in  
11:49:28 22 your mind, and you were able to recollect the pitch because  
11:49:33 23 it was short; is that correct?

11:49:34 24 A. Not because it was short. It was approximately the  
11:49:39 25 same length as any other meeting.

11:49:42 1 Q. Do you recall any other individuals by the name of  
11:49:45 2 Wei Li?

11:49:45 3 A. No.

11:49:47 4 Q. So it's possible that you met another Wei Li, but you  
11:49:50 5 just -- you just wouldn't -- you wouldn't know him because  
11:49:54 6 you didn't know his name, correct?

11:49:56 7 A. It's possible that I could have met anyone and not  
11:50:00 8 known their name, right?

11:50:02 9 Q. Going back to your May 2011 purchase of CrispMic, you  
11:50:08 10 said -- you said earlier that you wanted to learn about  
11:50:11 11 beamforming, correct?

11:50:12 12 A. Yes.

11:50:12 13 Q. Why did you want to learn about beamforming?

11:50:15 14 A. At that time, we were investigating whether or not we  
11:50:22 15 could use beamforming techniques on the Amazon smartphone  
11:50:25 16 to accomplish different goals. And I had no knowledge of  
11:50:35 17 beamforming at that time, so I bought that product as part  
11:50:39 18 of my effort to educate myself.

11:50:42 19 Q. So. At the time, Amazon didn't have a project -- a  
11:50:47 20 product that performed beamforming, correct?

11:50:55 21 A. At the time, the only products I was aware of were the  
11:50:59 22 publicly known products and the product that I was working  
11:51:03 23 on, the Amazon Fire Phone.

11:51:06 24 Q. And Amazon's products did not have beamforming,  
11:51:09 25 correct?

11:51:09 1 A. Not at that time, no.

11:51:12 2 Q. So you were conducting an investigation to see how  
11:51:16 3 other people did beamforming so that you could do  
11:51:21 4 beamforming, correct?

11:51:22 5 A. We were conducting a feasibility, kind of exploratory  
11:51:29 6 period of research.

11:51:31 7 The purchase of the -- the Li Creative product was  
11:51:35 8 my own decision for educating myself. It wasn't directly  
11:51:40 9 related to the efforts we were doing.

11:51:43 10 Q. But, earlier, you talked about your meetings with  
11:51:46 11 suppliers, and, typically, the reason for bringing in a  
11:51:51 12 supplier would be so that you can use that supplier's  
11:51:55 13 technology, right?

11:51:55 14 A. Yes, of course.

11:51:56 15 Q. And so that you can incorporate that supplier's  
11:52:02 16 technology into your product, correct?

11:52:05 17 A. That would be the reason for meeting, yes. A supplier  
11:52:09 18 is hoping that you'll use their products or technologies.

11:52:17 19 Q. Amazon would need suppliers to provide the technology  
11:52:19 20 because Amazon itself was not making that technology,  
11:52:24 21 correct?

11:52:24 22 A. I don't agree with that statement.

11:52:25 23 Q. Why don't you agree with that statement?

11:52:27 24 A. Because Amazon hires a large amount of capable  
11:52:36 25 engineers to come up with solutions without relying on

11:52:39 1 external partners.

11:52:39 2 Q. Right. So in the case of beamforming, if you hired a  
11:52:42 3 supplier, it would be so that you can incorporate that  
11:52:46 4 technology into the Amazon product because Amazon at the  
11:52:49 5 time did not do beam -- beamforming; is that correct?

11:52:51 6 A. As I said, in the context of our project, the Amazon  
11:52:55 7 Fire Phone, we did not do any beamforming. It was early  
11:52:58 8 days. We were doing a feasibility study on what we could  
11:53:01 9 actually do in the form factor of a phone. We didn't  
11:53:04 10 progress to the stage of tapping other companies for  
11:53:08 11 beamforming technologies.

11:53:11 12 Q. Have you received any compensation from Amazon since  
11:53:15 13 February 2020?

11:53:17 14 A. No, sir.

11:53:19 15 Q. Do you expect to receive compensation from Amazon after  
11:53:26 16 this date?

11:53:28 17 A. No, sir.

11:53:29 18 Q. Is Amazon paying you for your testimony?

11:53:32 19 A. No, sir.

11:53:34 20 Q. Is Amazon reimbursing you for anything associated with  
11:53:38 21 your tech -- with your testimony today?

11:53:40 22 A. I'm not expecting any reimbursements for anything.

11:53:46 23 Q. Is it typical for a company that's making hardware  
11:53:50 24 products to meet with suppliers?

11:53:52 25 A. Yes, it's very typical.



11:53:54 1 Q. Why?

11:53:54 2 A. Well, especially in the context of hardware design,  
11:54:00 3 hardware products are comprised of all sorts of integrated  
11:54:04 4 circuits that are made by other companies. It would be  
11:54:07 5 impossible to make a hardware product without using other  
11:54:10 6 companies' products.

11:54:11 7 Q. And when you were talking about -- when Mr. Iturralde  
11:54:16 8 was questioning you about large companies versus small  
11:54:19 9 companies, are most of the electrical component suppliers  
11:54:23 10 made at larger companies?

11:54:25 11 A. Yes, yes.

11:54:26 12 Q. With respect to your study of beamforming in May of  
11:54:30 13 2011, were you working on just the Fire Phone at that  
11:54:34 14 point, or were you working with other projects, as well?

11:54:37 15 A. I only worked on the Amazon Fire Phone team from the  
11:54:42 16 start of my employment there up until after the project was  
11:54:46 17 canceled.

11:54:47 18 Q. Did you ever work with another team before May of 2011  
11:54:51 19 with respect to studying beamforming?

11:54:53 20 A. I didn't personally interact or work with anyone from  
11:54:56 21 any other team.

11:54:58 22 Q. When you're talking about the -- your purchase of the  
11:55:02 23 CrispMic, are you talking about a rectangular CrispMic  
11:55:07 24 product? Could you describe it for me?

11:55:11 25 A. Yeah. Like you said, it's rectangular. I believe it's

11:55:14 1 meant to be clipped on to the lid of your laptop as a sort  
11:55:17 2 of voice conferencing microphone.

11:55:19 3 Q. Did Amazon incorporate any of the technology from the  
11:55:24 4 CrispMic rectangular format -- CrispMic I is what we call  
11:55:31 5 them -- into the Amazon Fire Phone?

11:55:34 6 A. No.

11:55:34 7 Q. You mentioned earlier that you worked on the Echo Dot?

11:55:37 8 A. Yes.

11:55:37 9 Q. Was that anytime in 2011?

11:55:40 10 A. No, ma'am.

11:55:40 11 Q. Give me a time frame of when you worked on the Echo  
11:55:44 12 Dot.

11:55:44 13 A. Yeah, I was transferred to the Echo Dot team in 2015.  
11:55:50 14 I worked on that team in the last six months,  
11:55:53 15 approximately, of my time at Amazon.

11:55:55 16 Q. Mr. Holland, is there any question that Mr. Iturralde  
11:55:58 17 asked you about, that would somehow affect the truthfulness  
11:56:01 18 of the answers that you gave me earlier in your deposition?

11:56:06 19 A. No.

11:56:07 20 Q. And so your testimony is that some members of different  
11:56:13 21 projects have access to information from -- from other  
11:56:18 22 projects that are -- that are siloed, correct?

11:56:20 23 A. Right. Some engineers are -- they're disclosed on the  
11:56:23 24 details of other projects, and some aren't, depending on  
11:56:27 25 their status in -- in the overall hierarchy.

11:56:33 1 Q. So some engineers work on multiple projects, correct?

11:56:38 2 A. That's possible. When I say -- I'm thinking more  
11:56:45 3 managerial-level employees that may also happen to be  
11:56:50 4 engineers --

11:56:51 5 Q. I'm sorry, continue.

11:56:54 6 A. I'm speaking of more managerial-level employees that  
11:56:58 7 may also happen to be engineers.

11:57:00 8 Q. So as an engineer at Amazon on a siloed team, you're  
11:57:06 9 able to obtain disclosed information from another siloed  
11:57:11 10 team, if necessary, if you go through a manager, correct?

11:57:14 11 A. Yes. I suppose you would have to say that that's the  
11:57:17 12 case since we did receive this particular MATLAB script  
11:57:21 13 from an engineer on another project. However, that was  
11:57:26 14 done without sharing any details about what either of the  
11:57:30 15 projects are.

11:57:31 16 Q. So I guess my ultimate question is, if -- if an  
11:57:35 17 engineer from one project was interested in using  
11:57:41 18 technology from another project, there is a way to do that,  
11:57:46 19 correct?

11:57:46 20 A. Clearly, yes.

11:57:49 21 Q. So if an engineer wants to -- in this siloed  
11:57:55 22 environment wanted to get information from another project,  
11:57:59 23 would they have to go through and get approval from a  
11:58:02 24 manager?

11:58:02 25 A. Yes, absolutely.

11:58:03 1 Q. So, for example, there would be someone that would be  
11:58:09 2 approved to review, by a manager, certain limited  
11:58:15 3 information from another project to assist on the project  
11:58:17 4 that he or she was working on; is that fair?

11:58:20 5 A. Yes.

11:58:21 6 Q. One engineer couldn't just decide I want to look at  
11:58:29 7 some project and walk in and attend the meeting of another  
11:58:31 8 project?

11:58:32 9 A. That's correct.

11:58:33 10 (Videoclip ends.)

11:58:33 11 THE COURT: Does that complete this witness by  
11:58:35 12 deposition?

11:58:35 13 MR. HADDEN: Yes, Your Honor.

11:58:36 14 THE COURT: All right. Ladies and gentlemen, we  
11:58:42 15 are at the noon hour. We're going to break at this point  
11:58:46 16 for lunch. If you will, take your notebooks with you to  
11:58:49 17 the jury room. Lunch should be there waiting for you.

11:58:52 18 We're going to try to reconvene as close to 12:45  
11:58:58 19 as we can.

11:58:59 20 Please follow all my instructions about your  
11:59:01 21 conduct during the trial, including not to discuss the case  
11:59:03 22 among yourselves, and we'll have you back at about that  
11:59:06 23 time to continue with the next Defendants' witness.

11:59:09 24 With that, the jury is excused for lunch.

11:59:13 25 COURT SECURITY OFFICER: All rise.

11:59:14 1 (Jury out.)

11:59:14 2 THE COURT: Counsel, let me remind you that I will  
11:59:39 3 be looking for your newly revised and resubmitted joint  
11:59:43 4 proposed final jury instructions and verdict form by 3:00  
11:59:48 5 o'clock this afternoon.

11:59:49 6 With that, we stand in recess for lunch.

11:59:51 7 COURT SECURITY OFFICER: All rise.

11:59:52 8 (Recess.)

9

10 CERTIFICATION

11

12 I HEREBY CERTIFY that the foregoing is a true and  
13 correct transcript from the stenographic notes of the  
14 proceedings in the above-entitled matter to the best of my  
15 ability.

16

17

18	<u>/S/ Shelly Holmes</u>	<u>10/6/2020</u>
	SHELLY HOLMES, CSR, TCRR	Date
19	OFFICIAL REPORTER	
	State of Texas No.: 7804	
20	Expiration Date: 12/31/2020	

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